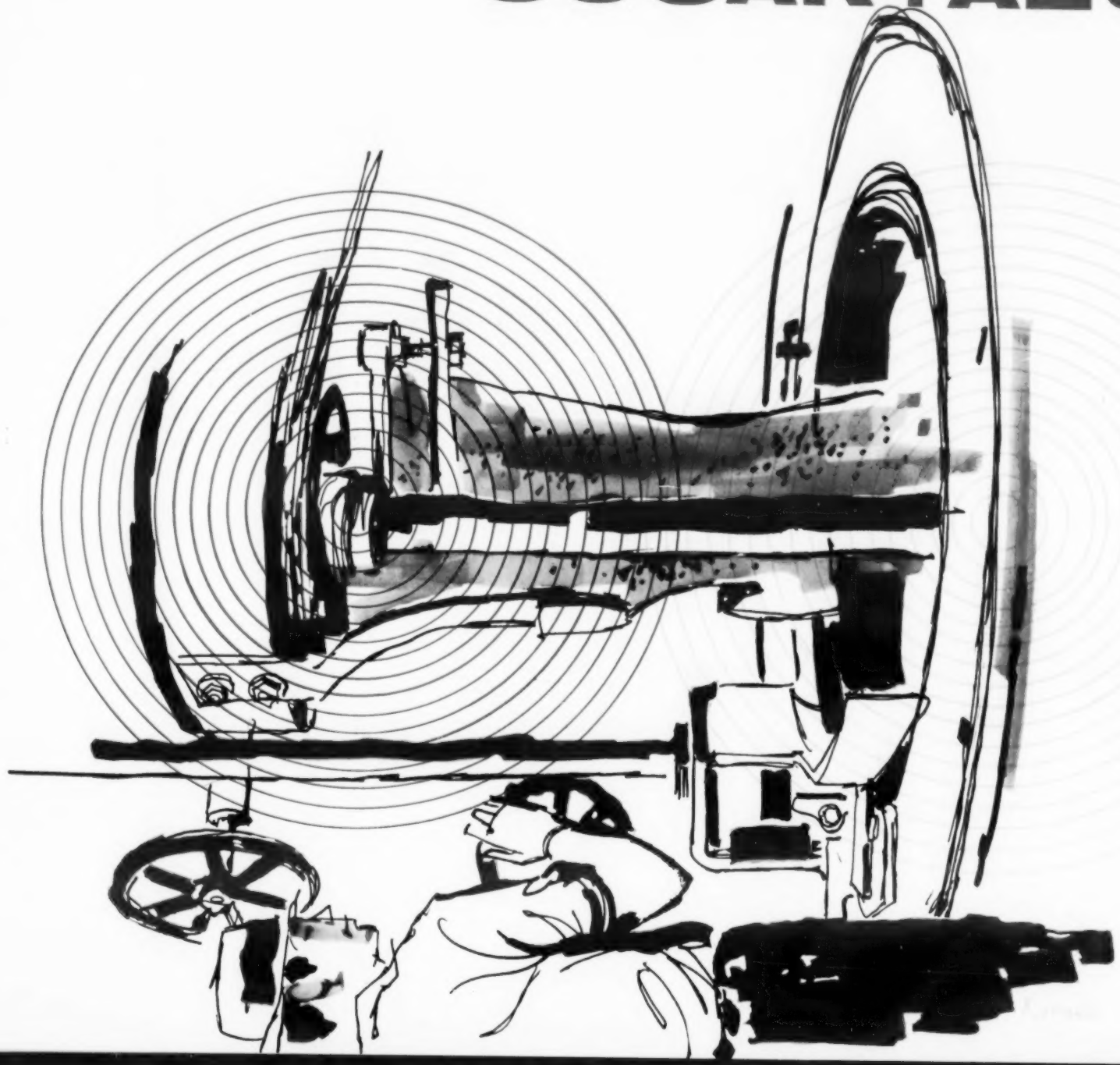
SUGAR y AZUCAR

FEBRUARY, 1959



FIVE DOLLARS PER YEAR · FIFTY CENTS PER COPY

Industry Standard for Lower Maintenance Costs

LQ600®

Here's Why: Long accepted valve maintenance costs are a thing of the past in thousands of plants where LQ600's have been installed . . . even in the most severe services where previous valves required repair or replacement after as little as two weeks on the line.

These outstanding savings are made possible by seats and discs of Brinalloy®, a patented Lunkenheimer alloy that is more resistant to wear and corrosion than 500 Brinell Stainless or 1000 Brinell Case-Hardened Stainless Steel.

Add to this the Lunkenheimer exclusive silicon-bronze Stemalloy®, the most durable stem material ever put into a valve, and you have two important reasons why LQ600's have established new low-maintenance standards everywhere they are installed.

For an actual comparison test, call the Lunkenheimer Distributor in your area. He is an expert on valve maintenance costs and will be glad to demonstrate the maintenance-saving benefits you receive when you install LQ600's . . . or write The Lunkenheimer Company, Cincinnati 14, Ohio

LUNKENHEIMER QUALITY

LUNKENHEIMER®

THE ONE *Great* NAME IN VALVES

○ = 8 x 16 Filter
⊘ = 8 x 14 Filter
⊗ = 8 x 12 Filter

⊘ Solitude
20,768 tons
(1 – 8' x 14')

⊗ Labourdonnais
15,937 tons
(1 – 8' x 12')

○ Beau-Plan
20,428 tons
(1 – 8' x 16')

⊗ Mont-Loisir
29,007 tons
(2 – 8' x 14')

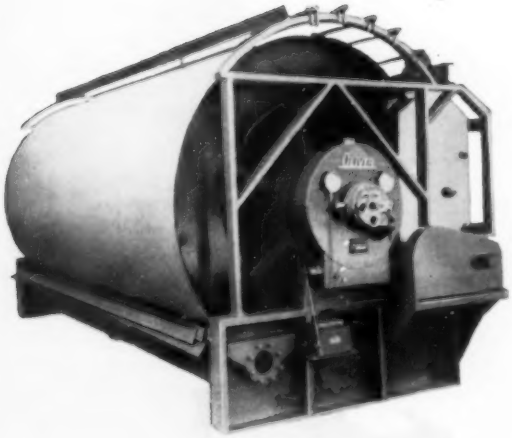
○ The Mount
21,451 tons
(1 – 8' x 16')

⊗ Constance
19,221 tons
(2 – 8' x 12')

○ Mon Desert Alma
35,900 tons
(1 – 8' x 16')

○ Union Flacq
56,315 tons
(2 – 8' x 16')

Beau-Champ ⊘
27,616 tons
(1 – 8' x 14')



Riche En Eau ○
13,517 tons
(1 – 8' x 16')

Union St. Aubin ⊘
23,777 tons
(1 – 8' x 14')

IN MAURITIUS

During the 1957 campaign, 281,403 tons of sugar were produced by factories equipped with Oliver-Campbell Filters. Dorr-Oliver is represented in Mauritius by Adam & Company, Ltd.

DORR-OLIVER
INCORPORATED
WORLD-WIDE RESEARCH • ENGINEERING • EQUIPMENT
STAMFORD · CONNECTICUT · U.S.A.

Oliver-Campbell – T.M. Reg. U.S. Pat. Off.

Sugar y Azucar for February 1959, Volume 54, No. 2. Published monthly by Russel Palmer Trust, Mona Palmer, Publisher. Publication Office, 109 Market Pl., Baltimore, Md. Editorial and executive office, 604 Fifth Avenue, New York 20, N. Y. Accepted as controlled circulation publication at Baltimore, Md.

SUGAR y AZUCAR

Volume 54 No. 2 February, 1959

CONTENTS

Low Temperature Beet Diffusion III 23
Automatic Palletization Facilities at Crockett 26
Human Relations 29
Checking Corrosion in Evaporator Tubes 30
Facts About Sugar 32
Tractor Developments for the Sugar Industry 36
Sugar Abstracts 38
Sugar Lost In Transit and Storage 43

CONTENIDO

45 Difusión de Remolacha a Baja Temperatura III
48 Sistema de "Paletización" Automático
62 Adelantos en Tractores para la Industria Azucareras
67 Extractos de Publicaciones Azucareras
72 Reunión de Tecnólogos en Azúcar de Remolacha

COVER *One of the most dramatic stations in the cane mill, beet factory and refinery is the battery of precision built, high speed centrifugals. The outline of a typical centrifugal, and even the motion of the machine, is depicted on the front cover of this month's issue by Charles Kroger.*

PORTADA *Una de las estaciones más espectaculares en la fábrica de azúcar de caña, en la de remolacha y en la refinería es la batería de centrífugas de alta velocidad construidas a precisión. En la portada de este mes, Charles Kroger ofrece un bosquejo de una centrífuga típica . . . y aun el movimiento de la máquina.*

Publisher, MONA PALMER
Editor, E. W. MAYO, JR.
Technical Editor, DR. O. W. WILLCOX
Editor, Spanish Section, JOSE M. PEÑA
Advertising Manager, R. E. SLIMERMEYER

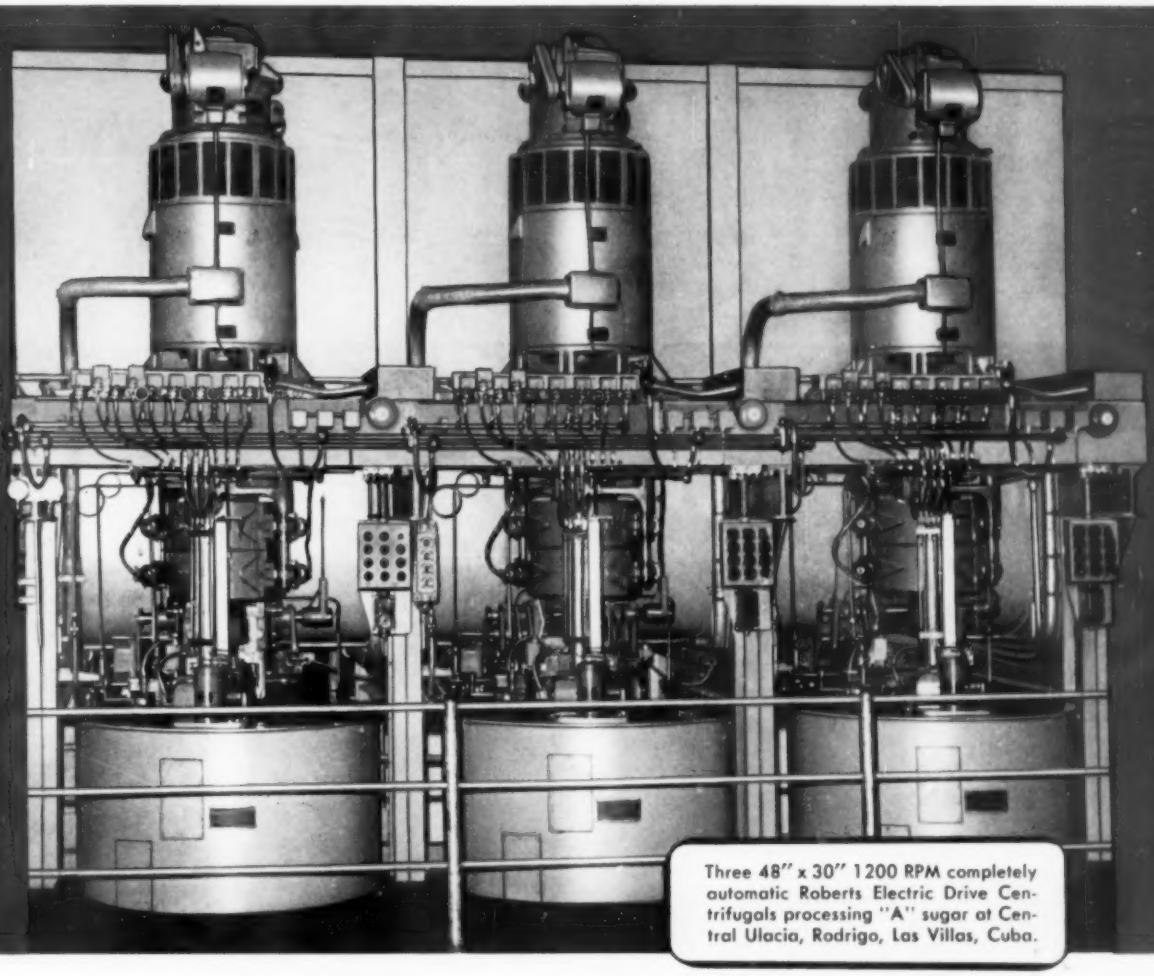
NBP BPA

EDITORIAL and EXECUTIVE OFFICE:
604 Fifth Avenue, New York 20, N. Y
Tel.: JUdson 6-4820
EUROPEAN OFFICE:
G. L. Fetherstonhaugh, St. Paul's Corner,
Ludgate Hill, London EC 4, Tel. CITY 5318
PUERTO RICO:
Arturo Riollano, P. O. Box 506
Isabela, Puerto Rico

Copyright 1959; Mona Palmer, Trustee. Successor to Facts About Sugar and the Planter & Sugar Manufacturer. Contents of previous issues can be found by consulting the Agricultural Index Service or the Engineering Index Service. Subscription may be paid the London office at £1-15-0 per year; single copies 3/6. Published Monthly. Subscription price $5.00 per year; single copies 50 cents.

THESE ARE

AUTOMATIC CENTRIFUGALS



Three 48" x 30" 1200 RPM completely automatic Roberts Electric Drive Centrifugals processing "A" sugar at Central Ulacia, Rodrigo, Las Villas, Cuba.

2682

100% AUTOMATIC

Loading, through plowing with all machines in the battery operating in

FIXED SEQUENCE

WITHOUT TIME LOSS FOR SEQUENCING

ANOTHER FIRST FOR WESTERN STATES

▼

increase production • improve quality • reduce cost

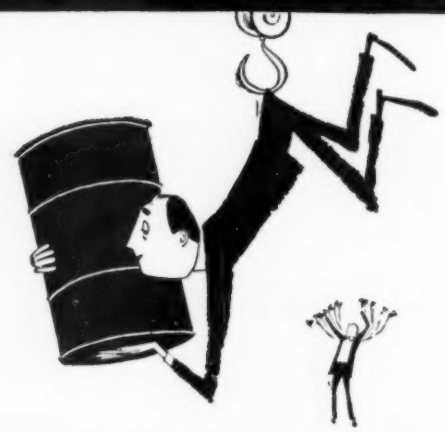
with entirely automatic G-8 Centrifugals

THE WESTERN STATES MACHINE COMPANY

HAMILTON, OHIO, U. S. A.

No bills for bags, drums, containers

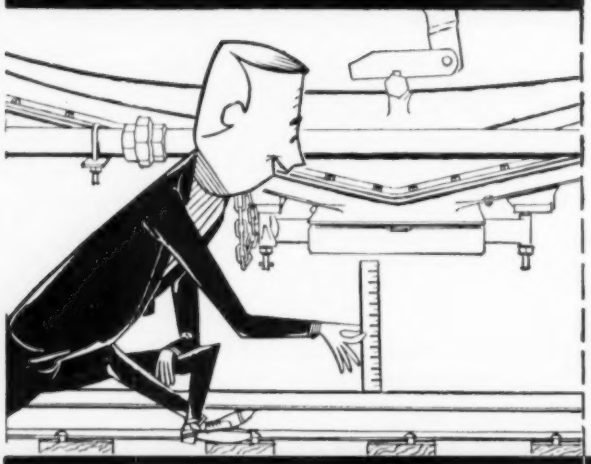
Easier, safer loading and unloading



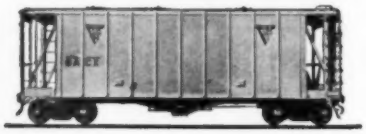
No sanitation problems in transit

No packing, racking or stacking

Far more clearance for unloading



Bulk shipping of dry, granular and powdered products in General American Airslide® Cars is safer, easier—and costs less!



Over 3000 Airslide Cars now in service or on order. A blower is all you need to unload cars into any conveying system. Write for bulk shipping information on your products.

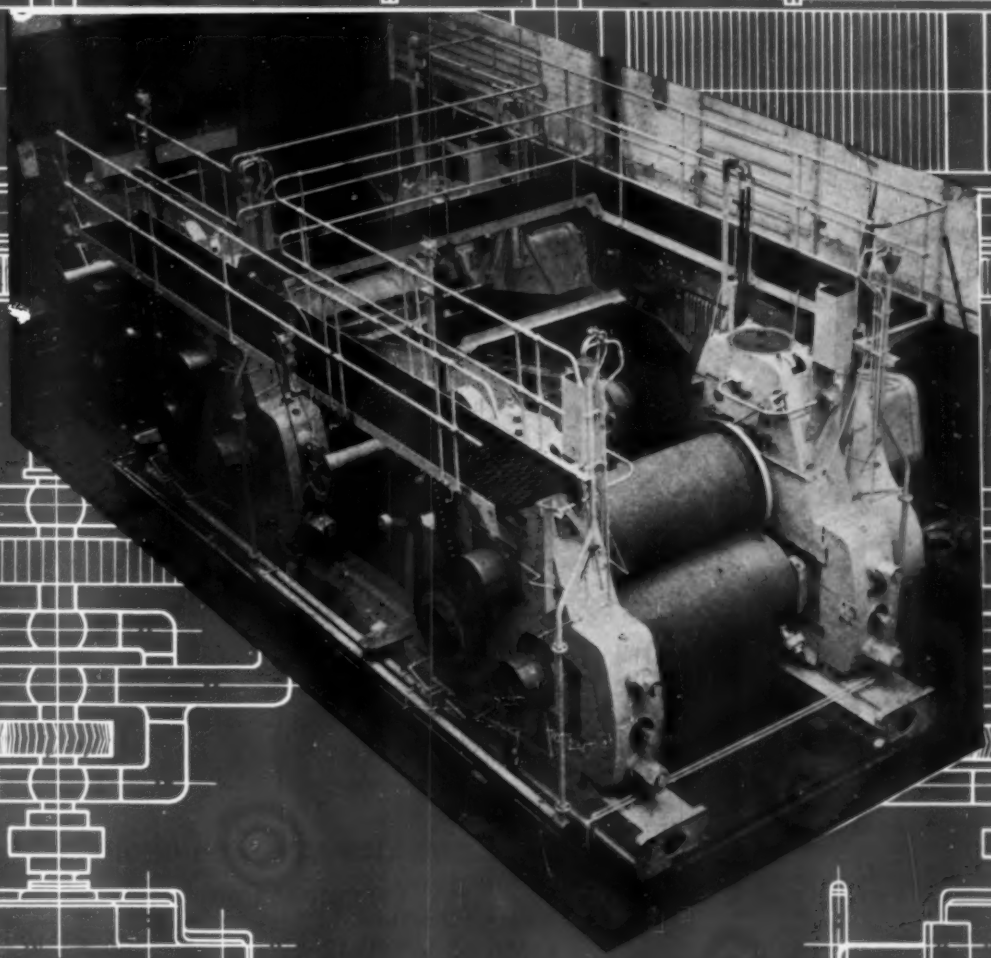
AIRSLIDE GENERAL AMERICAN TRADE MARK

GENERAL AMERICAN TRANSPORTATION CORPORATION
135 South La Salle Street, Chicago 90, Illinois

AIRSLIDE CARS are successfully shipping flour, semolina, sugar, starch, plastics, chemicals and other products.

SMITH

TURBINE DRIVEN SUGAR MILLS



A. & W.
SMITH
& CO. LTD.
SUGAR FACTORY &
REFINERY ENGINEERS
21 MINCING LANE
LONDON · E·C·3
Cable Address: "Sugrengine, London"

WORKS
COOK STREET
GLASGOW · C.5

Operate Throughout the Sugar World

NEW DESIGNS

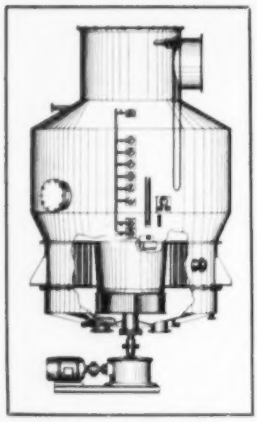
in Sugar Factory Equipment by

PROCESS ENGINEERING and DEVELOPMENT CO.*

P. O. Box 13233 Houston, Texas, U.S.A.

** Licensee of Truman B. Wayne & Associates, Sugar Industry Designers and Consultants*

SAVE TIME, LABOR and MONEY!

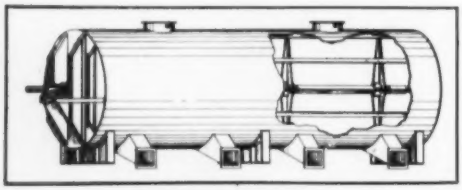


FORCED CIRCULATION VACUUM PANS

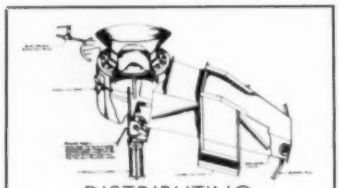
FORCED CIRCULATION VACUUM PAN: Compact bottom drive eliminates long impeller shaft and internal bearings within liquor and vapor spaces. PEDCO designed impeller follows accepted hydraulic principles. Means for keeping massecuite out of single bearing, and for lubrication without oil contamination of massecuite are provided. Large PEDCO vacuum pans have dual massecuite discharge nozzles; smaller ones have single discharge centrally located.

The circulator unit and pan bottom, especially designed to fit existing vacuum pans, are available for modernizing old pans.

CIRCULAR MASSECUITE MIXER: Recommended for all direct consumption sugar massecuites, and in the refinery and raw sugar house for the higher purity raw strikes. Instead of hosing down between strikes, simply use steam out nozzles from steam manifold on top. Eliminates watery massecuite charges near end of strikes which interfere with operation of automatic centrifugals. Since pan strike temperatures are maintained by full insulation of these mixers, no internal heating coils are required. A major advance over the usual types of open massecuite mixers.



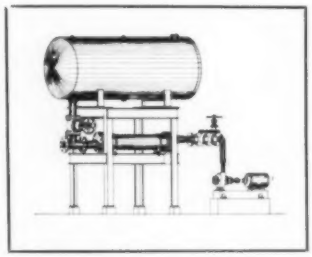
MASSECUITE MIXERS



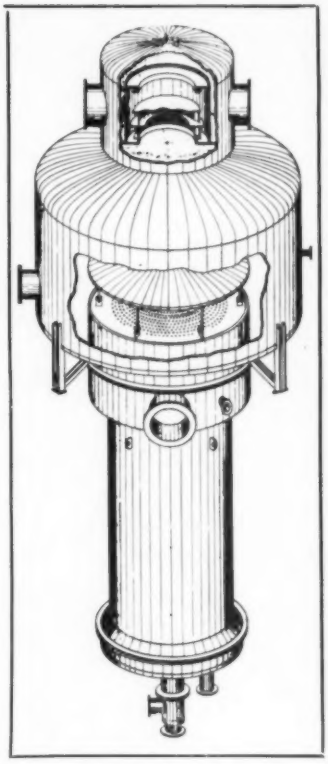
DISTRIBUTING FOOT VALVES

DISTRIBUTING FOOT VALVE: This ingenious vacuum pan discharge valve will save much space in new boiling house layouts that is ordinarily occupied by massecuite chutes, gates and troughs. It allows massecuite discharge under full head at any point of a 360° circle. Elimination of massecuite troughs shortens pan discharge time and speeds pan cycles. Available with pneumatic or hydraulic operators.

SUPERHEATED CENTRIFUGAL WASH WATER SYSTEM: Closed, pressure heating system. No waste of steam condensate as occurs with open heaters. No steam condensate odors, chemical carry-over and oil contamination from steam to contaminate direct consumption sugars. Available in large capacities sufficient to handle all centrifugal batteries, and with or without demineralizers. Fully automatic operation.



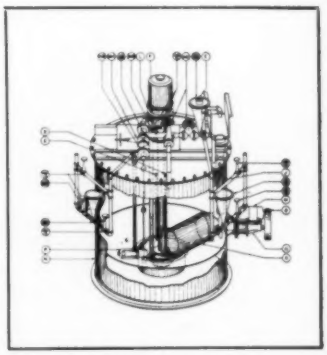
SUPERHEATED CENTRIFUGAL WASH WATER SYSTEMS



LONG TUBE EVAPORATORS

LONG TUBE EVAPORATOR: The best answer to the pre-evaporator requirement for existing multiple effects. Very high evaporating capacity may be provided in a small space. Its rapid circulation feature reduces the number of boil-outs per grinding season, and is highly advantageous with muddy cane. May also be used in multiple effect arrangements. Complete instrumentation control, no operator.

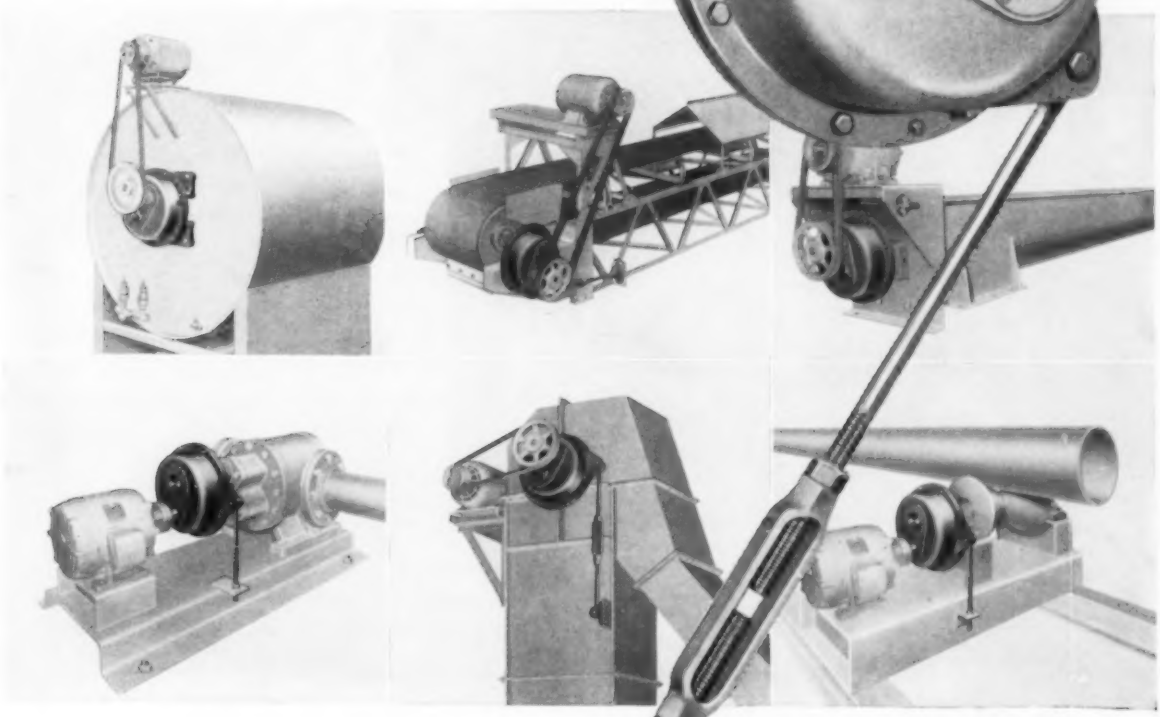
SYRUP DILUTION TANK: Automatically heats and dilutes to constant density, centrifugal run-off syrups and molasses. Also used as secondary melters. The same PEDCO dilution tank can receive, prepare and automatically pump out their residual syrup or molasses content from successive strikes of different purities. It requires no operator, eliminates the necessity for heating and dilution at the pan floor, and insures crystal-free pan feed stocks at constant temperature and density. Eliminates reciprocating steam pumps, drips, oily condensate. Set it anywhere without special tank and pump foundations.



SYRUP DILUTION TANKS

NEW! LINK-BELT

shaft-mounted speed reducers



The ultimate in ease of purchasing, of mounting, of maintenance

No other shaft-mounted unit can equal the combination of convenience, dependability and precision provided by the new Link-Belt shaft-mounted speed reducer.

Installation is easy . . . requires no special tools. Motor and drive can be positioned to meet practically any space and application need. Tie-rod turnbuckle permits fast, sure belt tensioning . . . leakproof lubrication assures long-lasting service. In addition, Link-Belt simplifies purchasing and selection by offering pre-selected recommendations over a broad range of mechanical power transmission requirements . . . plus "off-the-shelf" availability.

For full facts on industry's newest shaft-mounted speed reducers, contact your Link-Belt representative. Or write direct for Book 2618.

DESIGNED TO SIMPLIFY AND SATISFY THE MAJORITY OF SPEED REDUCTION JOBS, Link-Belt shaft-mounted speed reducers are made in single and double reductions up to 40 hp. Wherever they're used, they maintain lasting efficiency with such features as hardened precision gearing, live-action lubrication, long-life ball bearings and cast iron two-piece housing. Overload release device can be furnished as original equipment or applied in the field.

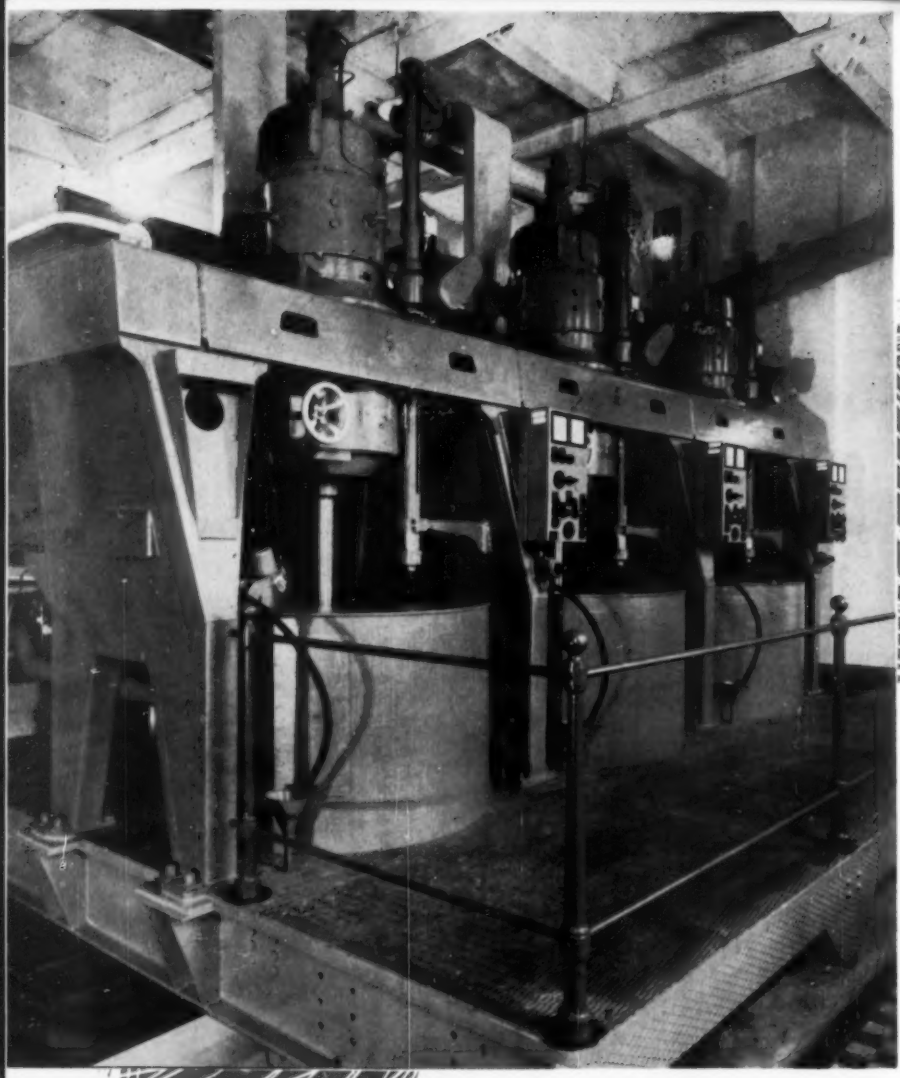
Send for your copy of Shaft-Mounted Speed Reducer Book 2618 today.

LINK-BELT

SPEED REDUCERS

14,947-E

LINK-BELT COMPANY: Engineers • Manufacturers • Exporters of Machinery for Handling Materials and Transmitting Power • Established 1875.
EXPORT DIVISION: Dept. 259-SYA, 233 Broadway, New York 7, U.S.A., Cable Address: Linkbelt—New York • Australia, Marrickville (Sydney) • Brazil, Sao Paulo • Canada, Scarboro (Toronto) • South Africa, Springs • Representatives Throughout the World.



Battery of complete automatic centrifugals at Sucrerie de Colleville, France.

In beet and cane sugar factories and refineries there is always a tendency to modify processing in such a way as to obtain ever greater continuity. To carry this development a stage further, ASEA-Landsverk have brought out

The Fully Automatic Centrifugal

with Leonard Drive

This centrifugal offers the same advantages as the continuously-running, constant-speed machine with reference to low current consumption and low cost of attendance.

Its main features are

Stream-line Design
Variable Top and Charging Speeds
Entirely Electric Regenerative Braking
No Current Peaks
Pneumatically Operated Charging Mechanism
Motor-operated Unloader
Centralized Automatic Timing

Suitable for all kinds of Sugar

We are represented and have service facilities in most sugar producing countries.

For further information apply to the nearest ASEA office or direct to

ASEA

Västerås, Sweden

FALK Gear Drives help inaugurate modern era of sugar-mill efficiency

When Lula Factory began to convert to steam-turbine drive, ten years ago, it marked the beginning of a modern era in sugar production. The Lula installation demonstrated for the entire industry a new and better method of obtaining higher grinding capacities plus more efficient, more economical operation.

The Falk Corporation is proud to have furnished the new gear drives and shaft couplings for the Lula conversion. Prior to that time, Falk had supplied many large gears for sugar mill drives, also high-speed gear reducers for turbine applications in other industries...Since the Lula installation, we have furnished various combinations of gearing for other turbine-driven sugar mills. All are *precision helical gears* of highest mechanical efficiency (98½% per gear mesh under full load). And all afford the increased load-carrying capacity of the exclusive Falk extra-depth tooth form.

The performance of any sugar mill depends largely upon the reduction gearing. So, when you consider installing a turbine drive on an old or new mill, it will pay you to consult your Falk Representative, write us direct, or ask your mill builder or supplier to consult Falk.

○ GEARS—Single Helical or Herringbone

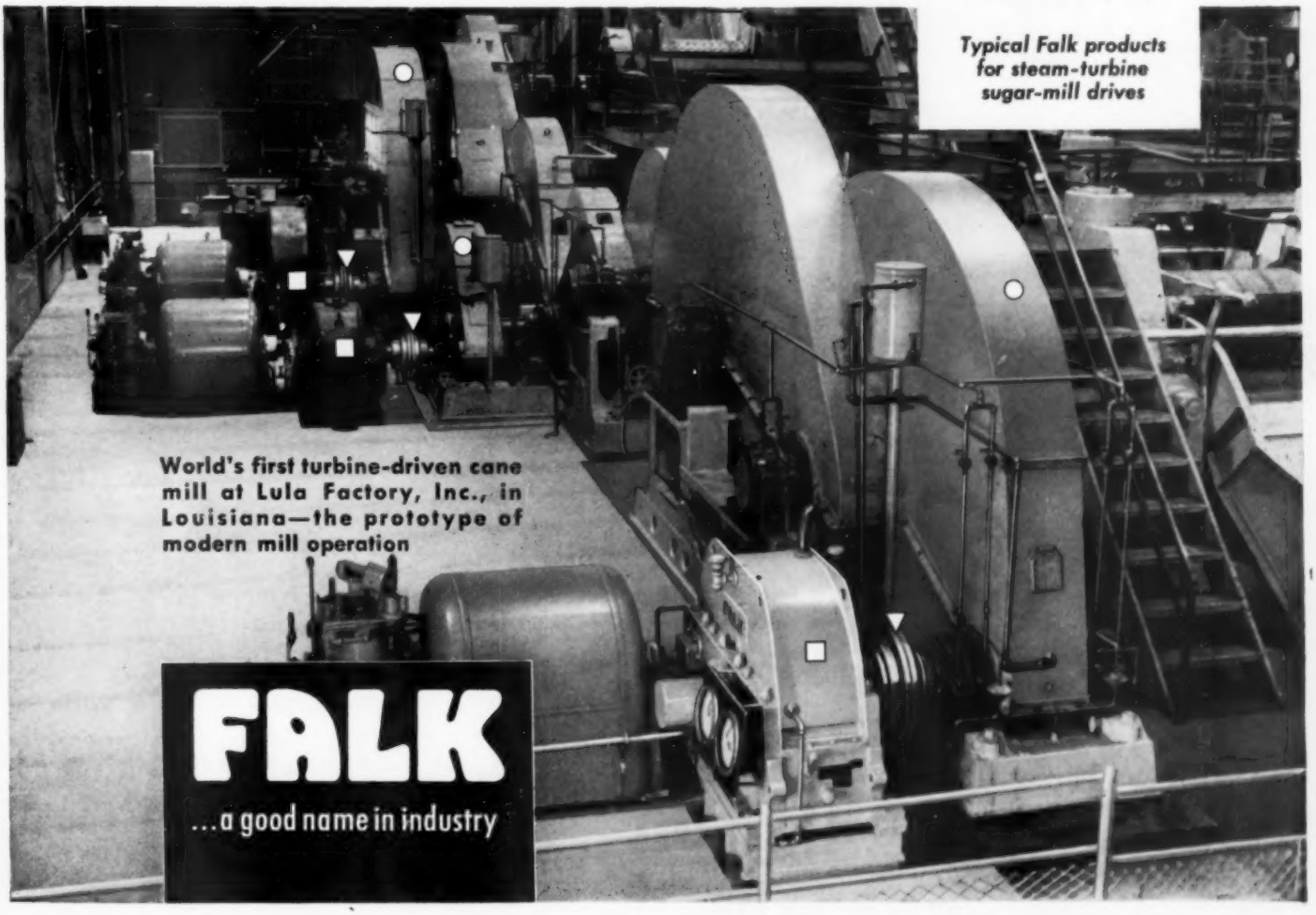
□ HIGH SPEED DRIVES

▽ STEELFLEX COUPLINGS

THE FALK CORPORATION, MILWAUKEE 1, WISCONSIN

MANUFACTURERS OF QUALITY GEAR DRIVES AND FLEXIBLE SHAFT COUPLINGS

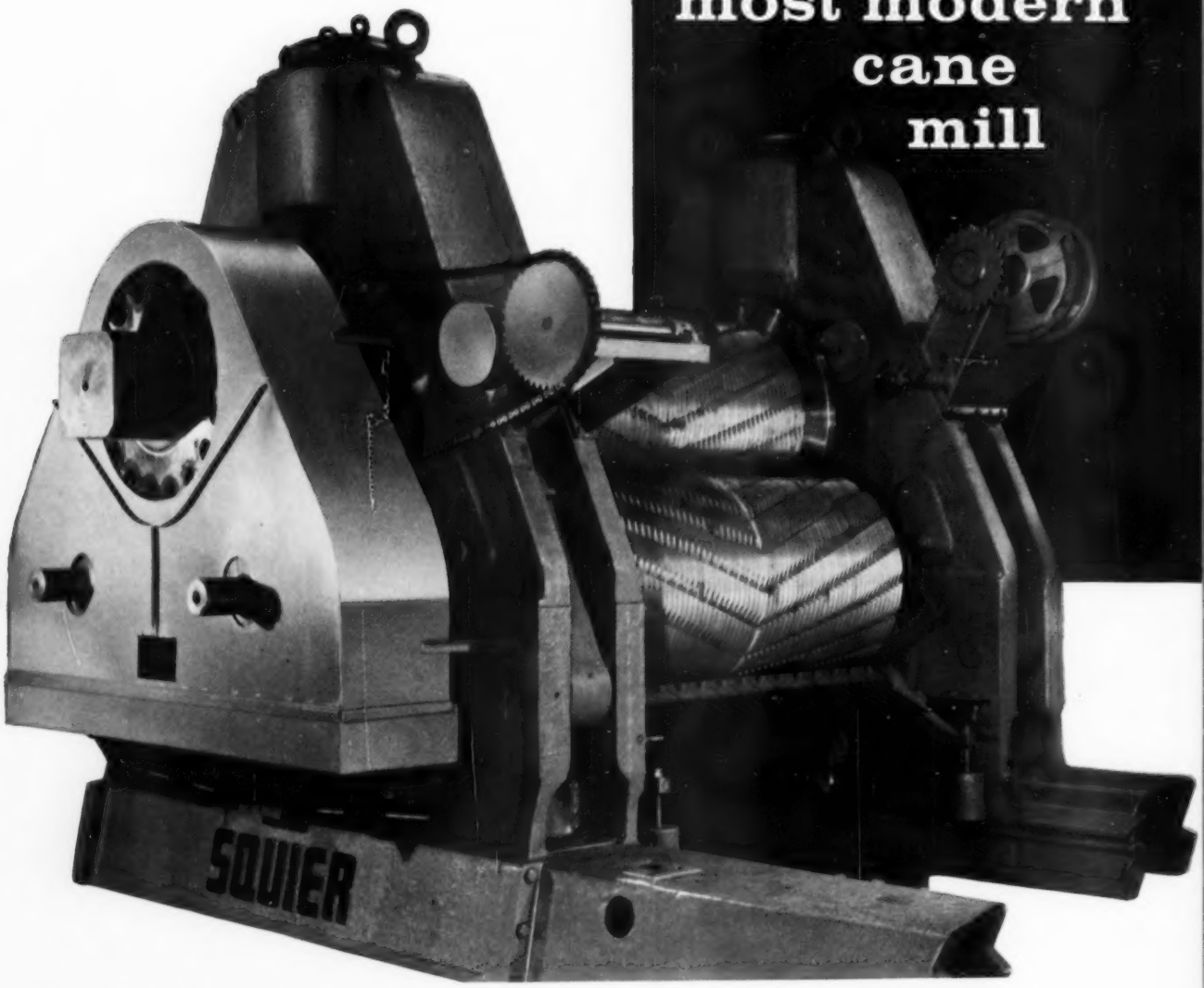
Representatives in many principal cities



Typical Falk products for steam-turbine sugar-mill drives

World's first turbine-driven cane mill at Lula Factory, Inc., in Louisiana—the prototype of modern mill operation

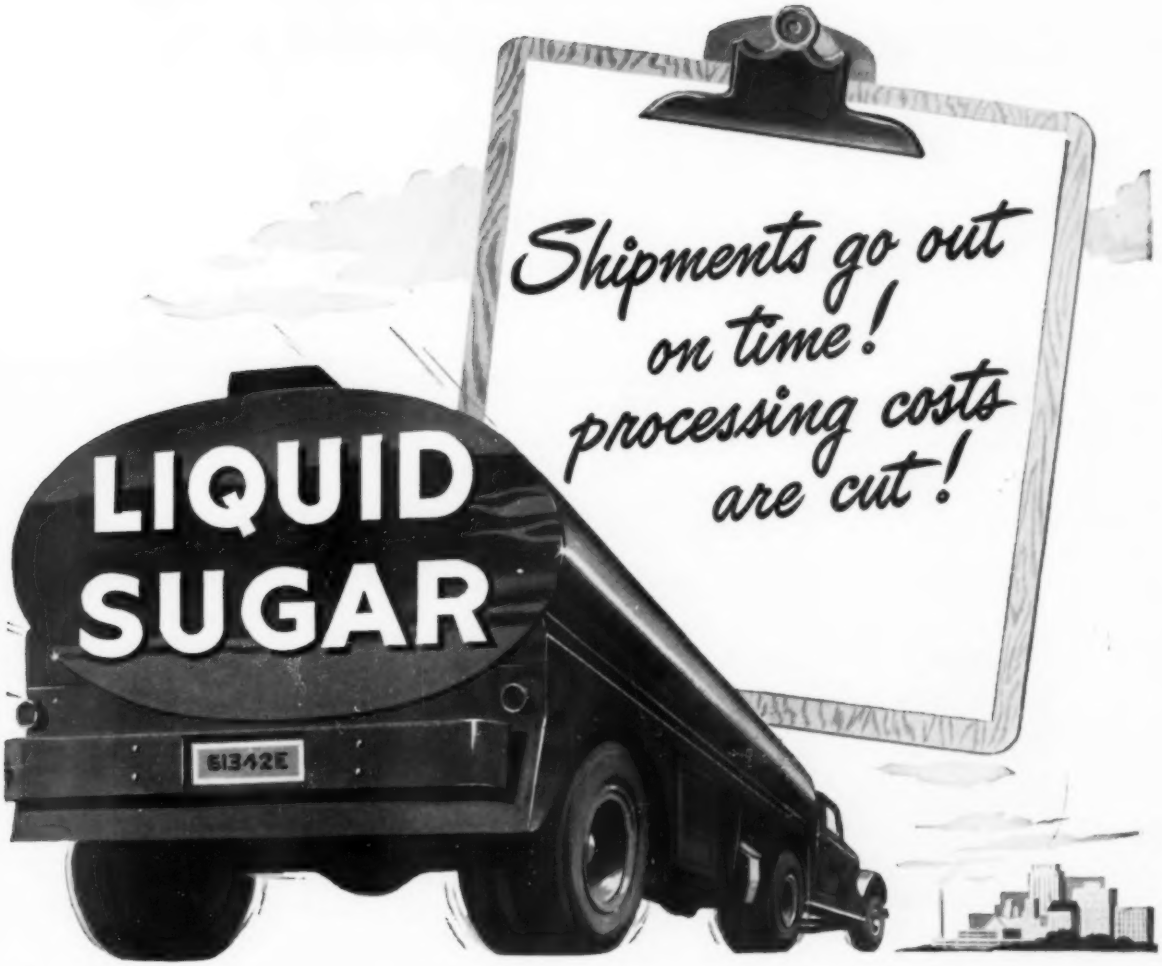
exclusive SQUIER features give you world's most modern cane mill



- Vertical Removal of All Rolls
- Free Floating Top Roll
- Smooth Lines for Cleanliness
- Housing Integral with Bedplate
- Coarse Grained Rolls
- Ground & Polished Shaft Journals
- Large Diameter Juice Rings & Flanges
- Full Involute, Long Tooth Crown Wheels
- Self-Contained Hydraulic Cartridge
- Large Diameter Hydraulic Pistons
- Fully Enclosed Top Roll Bearing
- Built-In Spare Bottom Roll Bearings
- Bearings are Water-Cooled
- Bearings are Force-Lubricated
- Convenient Turnbeam Adjustment
- Visual Inspection of Turnplate
- Narrow Turnplate
- Turnplate Removable Thru Side of Housing
- Hydraulic Roll Adjusters
- Deep Stainless Steel Juice Troughs

SQUIER is uniquely well-equipped to supply your needs for everything from replacement equipment to a major modernization program, or a complete new factory. You can rely on SQUIER's world-wide reputation. For full information, request Bulletin 1000.

THE SQUIER CORP.
ENGINEERS AND MANUFACTURERS
BUFFALO, NEW YORK, U.S.A.



YOU SAVE both time and money when you clarify sugar liquors with Celite* diatomite filter aids. Save time because Celite filtration lets you combine P_2O_5 lime defecation, decolorization and clarification *all* in one operation (and insures you of outstanding color removal and brilliant clarity, too). Save money because you use your existing mixing tanks and filters and reduce decolorizing vegetable carbon consumption. In addition, in bone char refineries, char filter loads are also reduced when Celite filtration is used.

Celite also gives you important advantages over other diatomites. First, its lower wet density provides greater filter surface coverage . . . six bags do the work of seven bags of other diatomites. Second, you get more consistent results because Celite is more uniform. Each bag is mined and processed at the world's largest and purest commercial diatomite deposit . . . and sped to you direct or through J-M's nationwide warehouse network.

JOHNS MANVILLE JM PRODUCTS

For more information on how Celite filtration can save you time and money and give you better filtration results, call your nearby Celite engineer or write Johns-Manville, Box 14, New York 16, N.Y. In Canada, Port Credit, Ontario.

Johns-Manville CELITE
diatomite filter aids

when you filter with CELITE

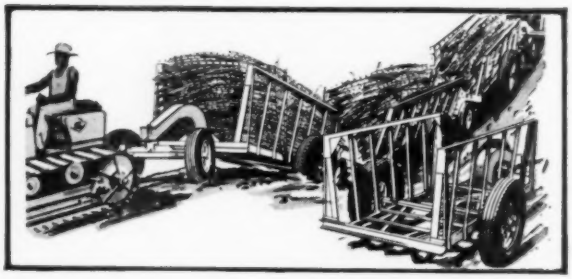
*Celite is Johns-Manville's registered trade mark for its diatomaceous silica products

CANE HANDLING

IS QUICKER — EASIER
and *much* less costly —

by *Markham*
TRAILER TRAIN

FOR LARGE LOADS AND LONG HAULS, the Markham 5-Ton Heavy Pattern Sugar Cane Cart is designed to operate over the roughest terrain and is ideally suited for the long journeys between plantation and factory. The large diameter rear wheels enable this cart to traverse uneven ground with ease. The swivel and pivot mounting of the front axle gives the Markham 5-Ton Heavy Pattern Sugar Cane Cart great stability and makes it extremely manoeuverable.

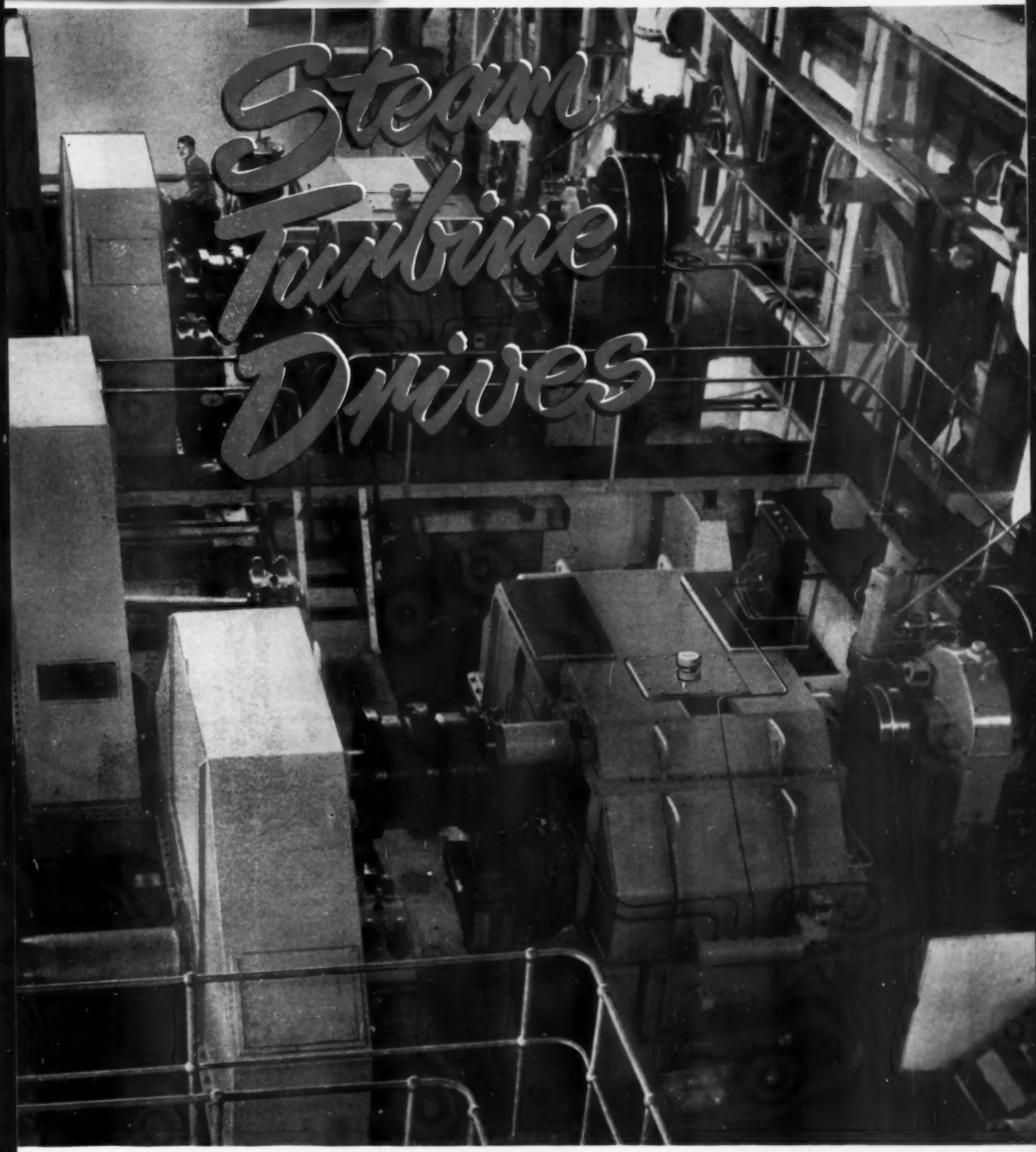


Cane Trailer trains will work easily over rugged terrain, and their exceptional strength of construction ensures a long, trouble-free life.

Martin-Markham

STAMFORD, LINCS. ENGLAND

Active selling organisations are still required in some of the Sugar Growing areas of the world, and bona fide trade enquiries will be welcomed.



Two 800 h.p. drives in British Guiana

DUNCAN STEWART

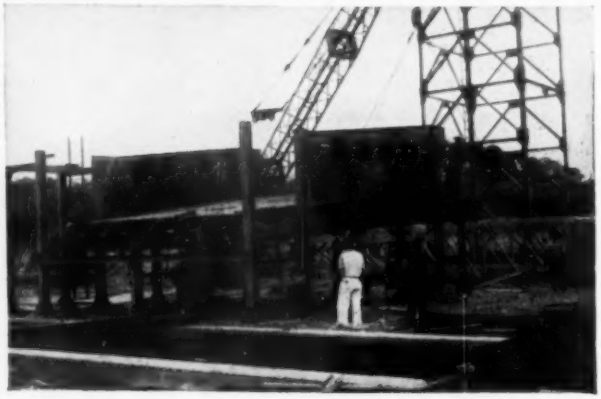
& COMPANY LIMITED • GLASGOW

155/D.S

Even Feed...

. . . This first essential for good extraction is readily secured by the Mirrlees Feeding Table with levelling kickers.

The illustration shows an installation at a South American factory built and equipped by Mirrlees; the lower photograph was taken during construction. The Unloading Crane was also supplied by Mirrlees.



THE

MIRRLEES WATSON COMPANY LIMITED

Head Office and Works :
Scotland Street, Glasgow, C.5, Scotland

London Office : 38 Grosvenor Gdns., S.W.1

'Jeep' vehicles are doing the world's work!

on the sugar plantation...

Sugar operators use 'Jeep' vehicles to spread their cost over more jobs and increase their profits. Through three power take-off points, they supply *mobile power* to run winches, generators, belt-driven machinery—and more! 'Jeep' vehicles are *functionally* designed... job-styled for rugged work on or off the road. On steep mountain slopes, through dense vegetation, over deep-rutted roads, 'Jeep' 4-wheel drive traction takes you and your payload—*anywhere, anytime!*

WILLYS-OVERLAND EXPORT CORPORATION

TOLEDO 1, OHIO, U.S.A.

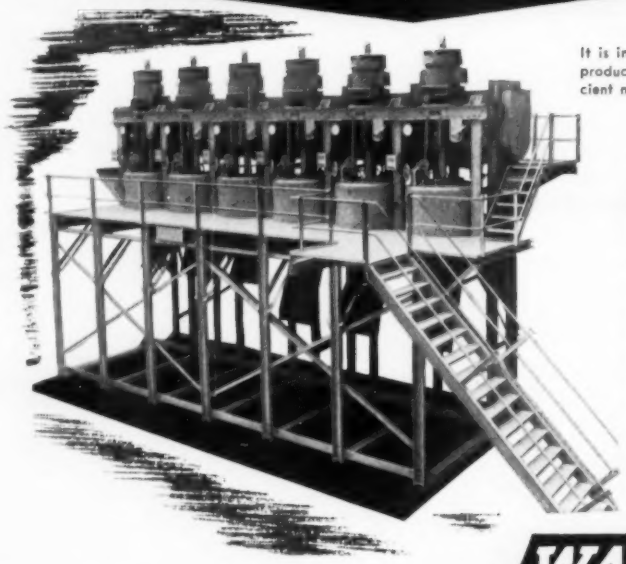
...a member of the growing KAISER INDUSTRIES

The 'Jeep' family—a Balanced Line of 4-wheel drive vehicles

Universal 'Jeep' | 'Jeep' Utility Wagon | 'Jeep' Truck | Forward Control 'Jeep' FC-170

"the world's most useful vehicles"

Up to specification ...



It is important in the highest degree that production should be maintained by efficient machinery.

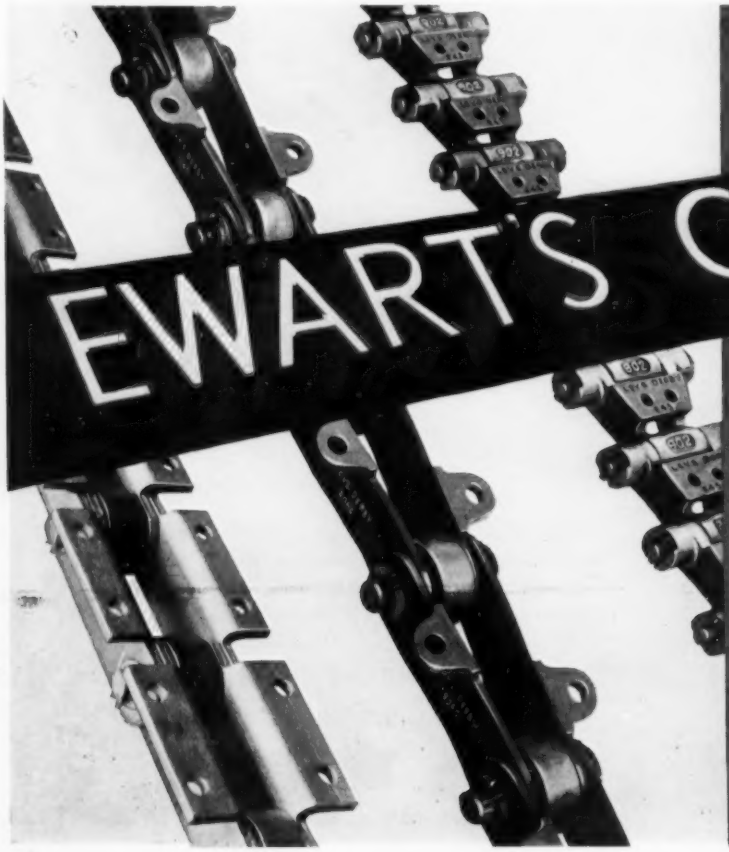
6—42" x 24" Electrically-driven centrifugals — Speed 480/960 r.p.m. Vertical enclosed two-speed motors, directly coupled to centrifugal spindles. Regenerative braking from top speed to half speed. D.C. injection braking from half speed to rest. Automatic water washing and steaming. Process timer controlling the duty cycle. Controlled-entry hand-operated mechanical discharging ploughs. Electrically-driven exhausting fan unit interlocked with steaming covers.

We also manufacture high-speed electrically-driven and high-speed water-driven centrifugals. Your inquiries will have our best attention.

DESIGNERS AND MANUFACTURERS OF MODERN CENTRIFUGAL MACHINES

WATSON LAIDLAW
AND COMPANY LIMITED

98 LAIDLAW STREET, GLASGOW, C.5, SCOTLAND
TELEGRAMS: "FUGAL" GLASGOW.



You can depend on

EWART'S CHAINS

for meeting the needs of the Sugar Industry

MALLEABLE IRON
CORROSION-RESISTANT CHAINS
ALSO
STEEL CARRIER CHAINS
UP TO 140,000 LB
BREAKING STRENGTH

EWART CHAINBELT CO., LTD
DERBY ENGLAND
TELEGRAMS: CHAINBELT DERBY

All three sugar daddies are sweet on DARCO®

Cane, beet or corn, the sugar you make can be refined to highest standards of quality at minimum cost, when you use DARCO activated carbon.

WANT PURITY? DARCO's high adsorptive power assures thorough removal of colors, odors, and other impurities. DARCO is highly pure itself, too . . . won't introduce contaminants.

WANT EFFICIENCY? The DARCO process requires minimum labor or equipment. DARCO has high bulk density; gives long filter cycles.

WANT HIGH YIELDS? DARCO takes out colloids that interfere with crystallization, and assures maximum sugar in the bag.

WANT ECONOMY? You'll save time, labor, steam and carbon by using DARCO. It's the choice of leading refiners everywhere.

Write to Atlas today for data on the DARCO process, and for recommendations on how it can be applied in your refining operations.

CHEMICALS DIVISION
ATLAS POWDER COMPANY
WILMINGTON 99, DELAWARE

In Canada: Atlas Powder Company, Canada, Ltd. Brantford, Ontario, Canada

No-4-23

when ever you need advice, NORIT will be there to give it.

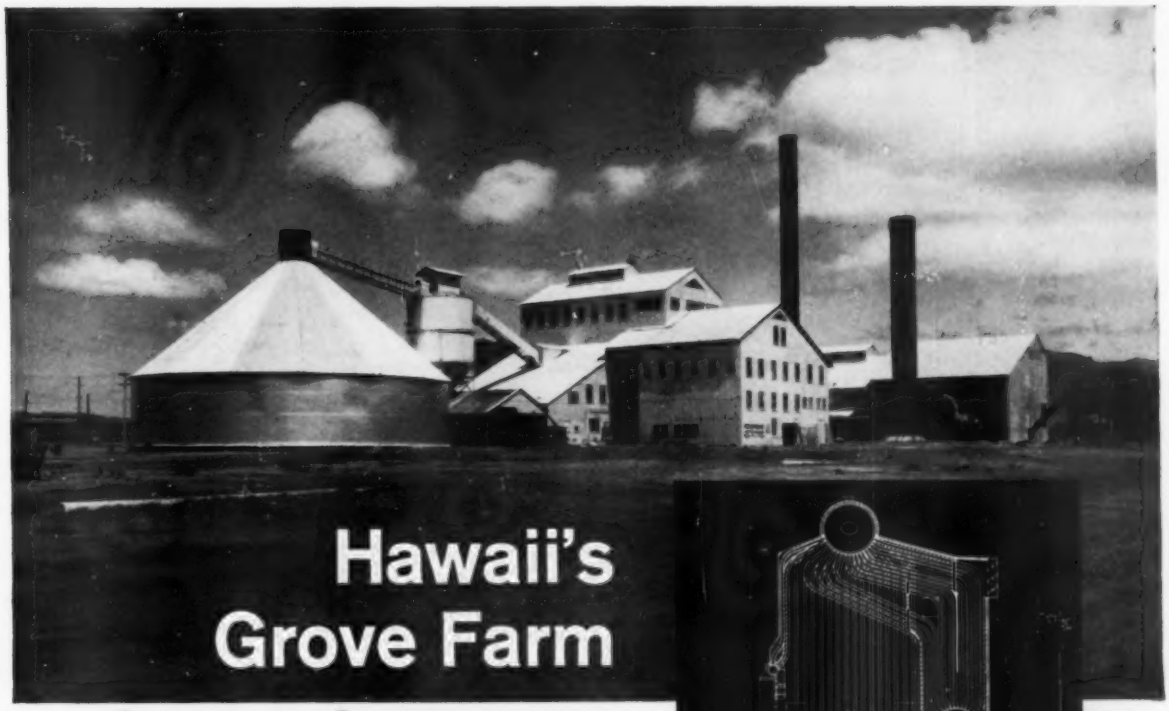
where ever your firm is located, NORIT's representative is on the spot to give you prompt service.

what ever the local circumstances may be, NORIT can supply you with a quality to suit them.

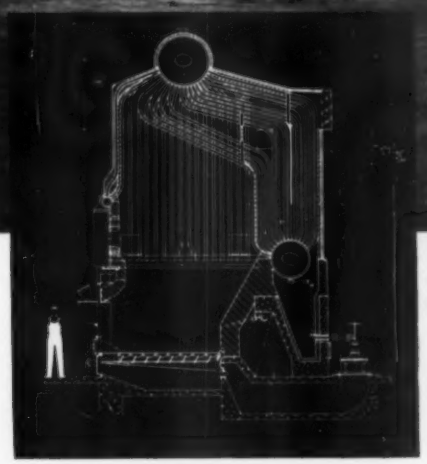
whom ever you ask, you will be told that NORIT gives value for money.

NORIT

Write for full particulars! UNITED NORIT SALES CORPORATION LTD. AMSTERDAM - HOLLAND.



Hawaii's Grove Farm burns bagasse the better way



...*with C-E Bagasse Burning Stokers*

Just ten years ago, the oldest sugar company in the Hawaiian Islands was purchased by Grove Farm Company, Ltd., operators of an adjacent plantation. The merger of these two properties, together occupying about 8,300 acres on the island of Kauai, marked the beginning of an intensive program of development and modernization. Besides acquiring high-yield cane varieties and advanced mechanical equipment, Grove Farm undertook an impressive series of projects . . . road building, field clearing, irrigation and drainage improvement, even the construction of a half-mile vehicular tunnel through solid rock. Today, with an annual production of about 35,000 short tons of 96° sugar, Grove Farm is widely regarded as one of Hawaii's most progressive sugar companies.

Like many other leaders in the sugar industry, Grove Farm sought the most reliable, most economical way to convert its bagasse to steam. C-E Boilers, equipped with stokers especially designed for bagasse burning, were chosen for the job. Such units, with an aggregate capacity of well over 5,000,000 pounds of steam per hour, are now in service all over the sugar-producing world. The design chosen by Grove Farm is shown in the inset above. Other Combustion designs—ranging in capacities up to 125,000 pounds—or more—of steam per hour—have also received the enthusiastic approval of performance and cost-conscious sugar operators.

When *you* need steam-generating equipment, be sure to contact Combustion Engineering, the company with extensive experience in *your* industry. Consult the C-E representative in your area, or, if you prefer, write directly to our Export Department in New York. C-167

associates, licensees and representatives throughout the free world

COMBUSTION ENGINEERING

Combustion Engineering Building
200 Madison Avenue, New York 16, N. Y.

ALL TYPES OF STEAM GENERATING, FUEL BURNING AND RELATED EQUIPMENT; NUCLEAR REACTORS; PAPER MILL EQUIPMENT; PULVERIZERS; FLASH DRYING SYSTEMS; PRESSURE VESSELS; SOIL PIPE

Five 48" x 24" 3 speed 375-750-1000 Automatic Ploughing Centrifugals at Fairymead Sugar Company.

IN AUSTRALIA...

the following factories have installed BROADBENT CENTRIFUGALS

BABINDA
BINGERA
FAIRYMEAD
KALAMIA
MARION
MARYBOROUGH
MOSSMAN
MOURILYAN
NORTH ETON
PIONEER
PLANE CREEK
ROCKY POINT
PROSERPINE
QUNABA
RACECOURSE
SOUTH JOHNSTONE
TULLY

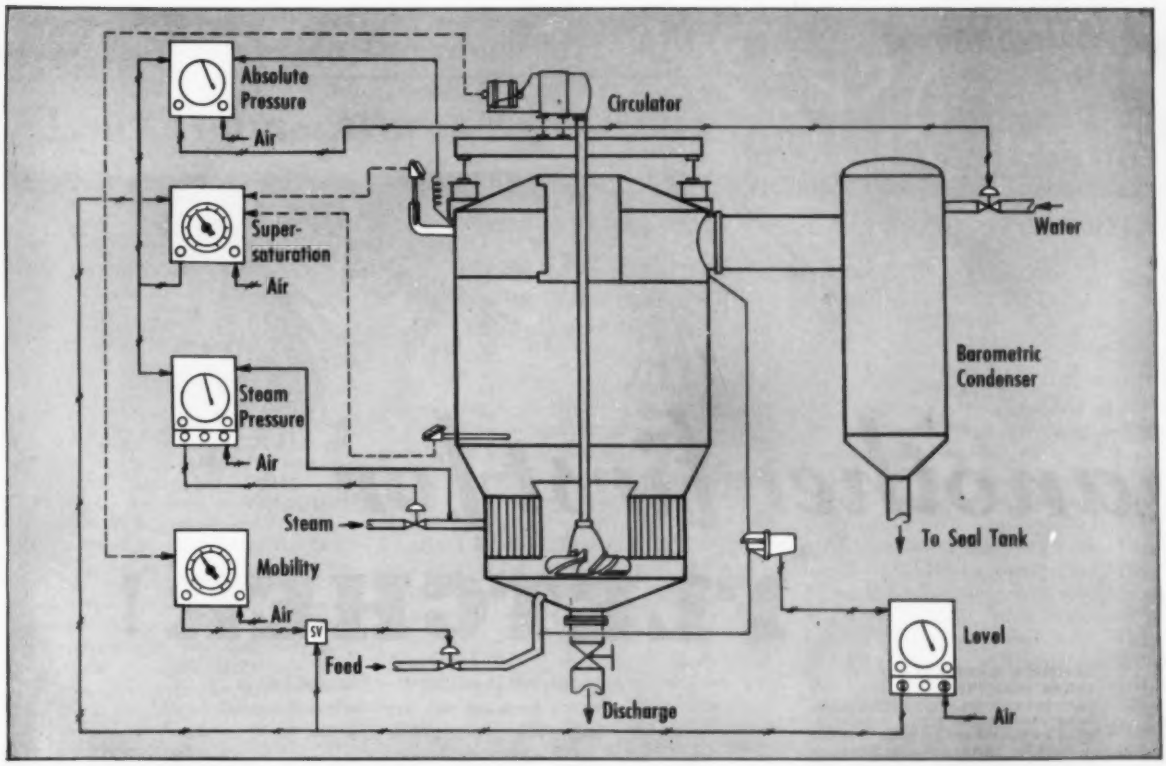
BROADBENT

THOMAS BROADBENT & SONS LTD. • CENTRAL IRONWORKS • HUDDERSFIELD • ENGLAND

The world's largest manufacturer concentrating entirely on industrial centrifugals

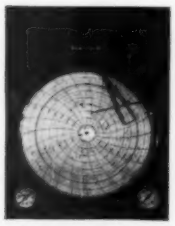
Telephone 5520-5

Telegrams: BROADBENT HUDDERSFIELD



This is but one of several types of Honeywell control systems for vacuum pans. It is fully automatic, and measures and controls vacuum, steam, level, mobility and super-saturation, with programming and sequencing affected by changes in these variables.

Supersaturation controller—holds process within metastable zone



Absolute pressure controller—holds vacuum at optimum value

Mobility controller—regulates feed in proportion to pan tightness

Improve sugar quality with vacuum pan controls matched to your needs

Let Honeywell provide the *exact degree* of control you require for efficient, economical vacuum pan operation.

For example, you can have an expandable control system with minimum instrumentation, to which you can add at any time. You can have a complete, but manually operated, system which can be made automatic at any time. Or you can have a completely automatic system, with the process programmed and sequenced by separate instruments or by changes in the variables themselves. Choose either the widely used *ElectroniK* controls or miniature, pneumatic *Tel-O-Set* instruments.

Whatever your choice, you can be sure your investment in Honeywell instrumentation will give you maximum returns in uniformly high-quality sugar, with savings in production costs.

For details on instrumentation for vacuum pan operation and other processes, call your nearby Honeywell field engineer. He's as near as your phone.

MINNEAPOLIS-HONEYWELL, Wayne and Windrim Aves., Phila. 44, Pa.

Honeywell

First in Control

another first for

FLETCHER!

COMPLETE PLANT FOR THE SUGAR INDUSTRY

CANE KNIFE SETS • MAXWELL SHREDDERS • FLETCHER MILLS WITH TURBINE MOTOR OR STEAM ENGINE DRIVE • "ATLAS" MILL ROLLER METAL • MAXWELL-BOULOGNE LIQUID SCALES • JUICE HEATERS • FLETCHER CLARIFIERS • FILTER PRESSES • SEALED DOWNTAKE EVAPORATORS • CENTRE-FLOW PANS • DRY AIR AND CO_2 GAS PUMPS • FLETCHER CRYSTALLIZERS • AMARILLA ROTARY DISPLACEMENT PUMPS

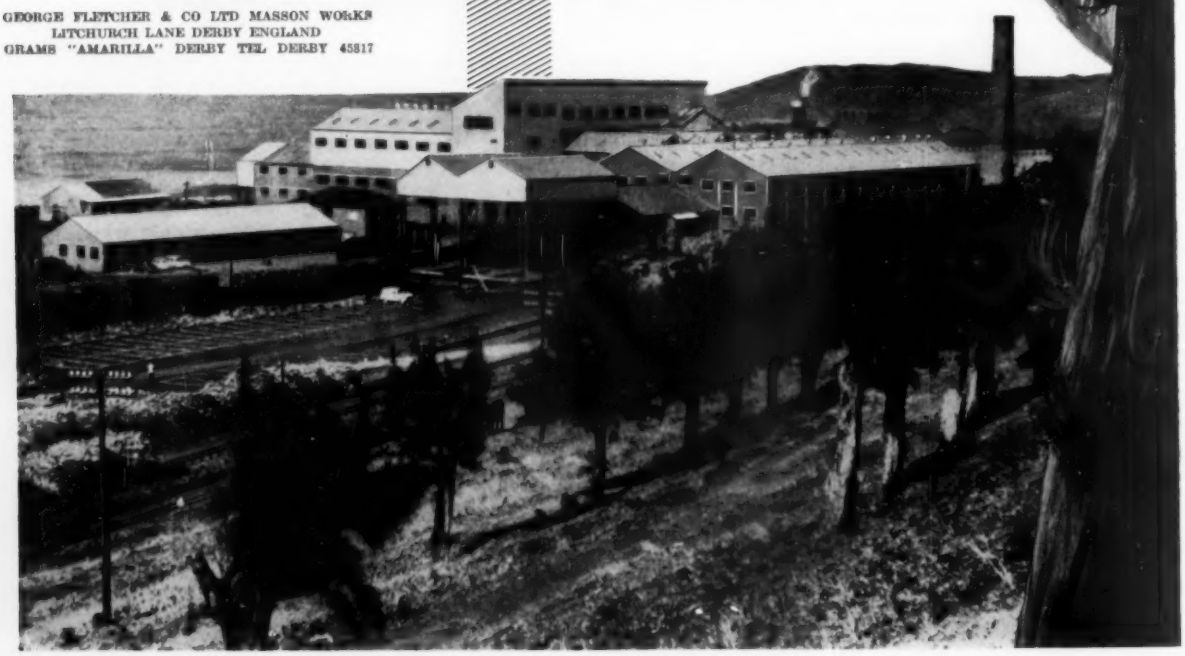
FLETCHER

GEORGE FLETCHER & CO LTD MASSON WORKS
LITCHURCH LANE DERBY ENGLAND
GRAMS "AMARILLA" DERBY TEL DERBY 45817

1

Forgive this outburst — but the fact is we've installed the first carbonatation sugar refinery attached to a raw sugar factory in South Africa, at Reynolds Bros. Ltd. factory at Sezala, Natal. It uses the double carbonatation process and produces the highest quality refined sugar.

We want you to know that FLETCHER will plan and install double carbonatation, sulphitation or vegetable carbon refineries to operate side by-side with YOUR sugar factory.



SUGAR

FEBRUARY, 1959

Further Studies On An Improved Method

Low Temperature Beet Diffusion III

By E. F. Boon, H. I. Waterman & P. W. ven der Poel
With The Collaboration Of
J. D. van Alphen & G. van Weert

In the May 1958 issue of Sugar y Azúcar the first article in this series was published on page 29. That article described a method of killing vegetable cells with chloroform gas at temperatures below 40°C. and cited experiments to show the advantage of using this method. The second article in the series appeared on page 26 of the September 1958 issue and described experiments with the electronic microscope which indicated that the vegetative tissue of sugar beet cell walls is decomposed under conditions prevailing with hot diffusion but not under conditions of cold diffusion. The present article deals with the purification of cold diffusion raw juices compared with the usual juice purification in general practice.—Editor

THE preceding papers proved that raw juice obtained by the cold diffusion process contains only a very small amount of colloidal contamination. Purification of these raw juices can be very simple. After treatment according to the method of Brieghel-Müller with 0.3% of lime a suspension is obtained, which can be filtered very easily at 90°C. The filtrate is free from proteins and pectic substances.

By means of ion exchangers it has proved possible to remove all the other impurities such as colored substances, ash and amino acids. There is no decrease in the capacity of the ion exchangers after many cycles of percolation and regeneration.

In our semi-commercial equipment we compared the following filtrations:

1. Filtration of prelimed raw jucies obtained by hot diffusion.
2. Filtration of prelimed raw juices obtained by cold diffusion.
   a. without sulphurous acid.
   b. raw juices, obtained from cossettes to which 0.05% of sulphur dioxide calculated on the weight of beet was added before the chloroform treatment.
3. Filtration of prelimed, limed and carbonated juices from hot diffusion.

The prelimings of the cold diffusion raw juices were carried out according to Brieghel-Müller with 0.3% of lime calculated on the weight of raw juice added. The preliming were carried out at either 60°C or 90°C.

Preliming of the hot diffusion raw juice was carried out also according to Brieghel-Müller with 0.2% of lime. The temperature during the preliming was either 60°C or 90°C. The temperature during the preliming does not influence the filtration velocities of the suspensions. If the preliming is carried out at 90°C the invert sugar in the juices is almost completely destroyed. If the prelimings are carried out at 60°C or lower, 70% of the invert sugar in the raw juices remains unchanged.

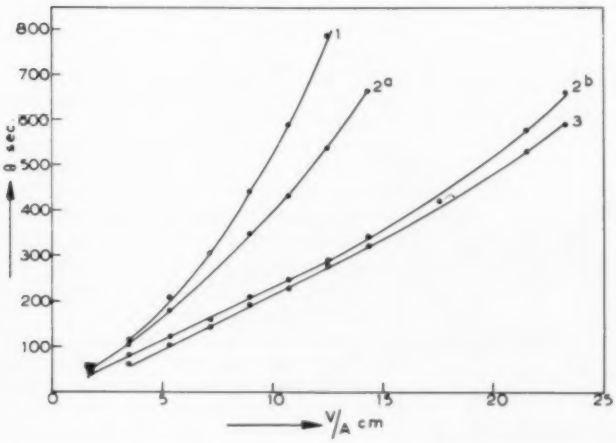
Although the filtration velocities in our investigations were adequate, it should be observed, that it was difficult to regulate the small streams of juice and milk of lime in the Brieghel-Müller apparatus. After preliming the suspensions were stored in a tank and kept at 90°C for a maximum of 40 minutes. The suspensions were stirred in order to prevent sedimentation. Filtering was done with about 100 litres of suspension. By means of a plunger pump the suspensions were transported to the filter. The maximum pressure on the frame and plate filterpress which was covered with cotton cloth was 2.5 ato. During the waiting period coloration of the sugar juices occurs. We were compelled to gather the suspensions for 40 minutes in order to obtain a sufficient quantity for a filtration experiment. In a factory, where long waiting periods are avoided the color formation will be much less and better results will be obtained. The results of the filtration experiments are summarized in table 1 and represented graphically in the figures 1 and 2.

In the tables and the graphs the following symbols are used.

Θ = time in seconds.

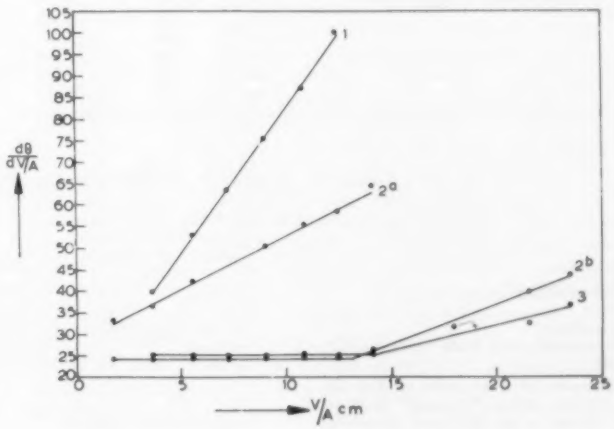
Volume of the filtrate, which was filtered per unit of filtering surface, plotted as a function of the time.

Figure 1.



First derivative of the volume, which was filtered per unit of filtering surface, plotted as a function of this volume.

Figure 2.



V = volume of the filtered suspension in litres.

$\frac{V}{A}$ = volume of the filtered suspension in cm^3 through a filtrating surface of cm^2.

$\frac{d\Theta}{d(V/A)}$ = first derivative of Θ to V/A.

$\frac{d^2\Theta}{d(V/A)^2}$ = second derivative of Θ to V/A.

By these investigations it has proved possible to filter the prelimed raw juices from the cold diffusion. The filtration of the prelimed raw juices, obtained by cold diffusion is as quick as the filtration of the juices from the hot diffusion, after preliming, liming and carbonation respectively. Filtration of the prelimed raw juices from hot diffusion is absolutely impossible. By the filtration experiments it has also been proved that before the killing of the cells with chloroform a small quantity of sulphur dioxide should be added to the cossettes. This has already been described in earlier papers. Without the addition of 0.03-0.05% of sulphur dioxide (calculated on the weight of beet) to the cossettes the filtration rate of the prelimed raw juice is poor.

The results of the analysis of the filtrates are represented in table 2.

The preliming of the cold diffusion juices was carried out with milk of lime of 5°Bé. This causes a relatively high dilution of the juices. In hot diffusion the preliming was carried out with milk of lime of 20°Bé. These raw juices are relatively less diluted. The main liming of the hot diffusion juices was carried out with lime pellets and caused no dilution of the juices.

The filtration properties of the prelimed juices from the cold diffusion are extremely good. Owing to the small quantity of lime, which is used for the purification, the color of the filtrate is more intense than the color of the hot diffusion juice after purification with 1.8% of lime. The amount of lime in the cold diffusion juice after the "second" carbonation to a pH of 8.5 is higher than the lime content of the thin juice obtained by hot diffusion. Probably this condition was caused by the very small quantity of lime which is used for the purification of the cold diffusion juices.

It has been proved by the authors, that the prelimed cold diffusion juices after filtration can be completely purified by means of ion exchangers. The percolation was carried out in columns of about 4 centimeter diameter. One column was filled with 200 ml of the strongly acid cation exchanger Imac C_{12}. (The other column was filled with 300 ml of the middle basic anion exchanger Imac A_{17}).

The precolation velocity was 1.5 litre/-hour. The percolations were carried out continuously. The effluent from the cation exchanger was lead through the anion exchanger without retardation. The acid percolates were not stored up. During the percolation samples from the percolates of about 50 ml were analysed. The results of the analysis are represented graphically in Figures 3, 4 and 5 in which the logarithm of the specific electrical resistance, the pH and the nitrogen content of the effluents are plotted as a function of the volume of juice, which was percolated before the sample was taken.

In Figure 3 the logarithm of the specific electrical resistance of the juice which has passed the cation exchanger and the anion exchanger respectively, is plotted as a function of the volume of the juice which was percolated before the sample (50 ml) was taken. From this figure it appears, that the specific electrical resistance decreases quickly after the percolation of about five litres of juice.

In Figure 4 the pH of the percolate is plotted as a function of the volume of juice which was percolated before the sample (50 ml) was taken. Curve I represents the pH values of the effluent from the cation exchanger. Curve II represents the pH values of the juice which has passed respectively the cation exchanger and the anion exchanger.

In Figure 5 the nitrogen content of the juice which has passed both ion exchangers is plotted as a function of the volume of juice which was percolated before the sample (50 ml) was taken. From this figure it appears that there is an increase in the nitrogen content of the percolate after demineralization of about four litres of juice.

Ion exchangers put at our disposal by the manufacturer "Industriëele Maatschappij Activit" Amsterdam.

The first four litres of the percolate are free from color and other impurities. The percolates have a slight odor which disappears during evaporation. From the juices purified by means of ion exchangers a com-

Table 1.

Kind of filtration*	Θ sec.	V litres	$\frac{V}{A}$ cm.	$\frac{d\Theta}{d(V/A)}$	$\frac{d^2\Theta}{d(V/A)^2}$
1. Preliming hot diffusion. 0,2% CaO	116	10	3,58	40	7
	208	15	5,37	53	7
	305	20	7,16	63	7
	444	25	8,95	75	7
	588	30	10,74	88	7
	793	35	12,53	100	7
2a Cold diffusion without SO_2 0,3% CaO.	50	5	1,79	34	2,4
	100	10	3,58	36	2,4
	170	15	5,37	42	2,4
	343	25	8,95	50	2,4
	432	30	10,74	53	2,4
	540	35	12,53	60	2,4
	670	40	14,30	64	2,4
2b Cold diffusion with 0,05% SO_2. Purification with 0,3% CaO.	42	5	1,79	23,5	
	79	10	3,58	23,5	
	119	15	5,37	23,5	
	156	20	7,16	23,5	
	201	25	8,95	23,5	
	245	30	10,74	23,5	
	284	35	12,35	23,5	
	342	40	14,32	26,0	1,8
	578	60	21,48	39,5	1,8
	650	65	23,27	43,0	1,8
3. Hot diffusion after preliming, liming and carbonation to p_H 10,8 respectively. Total consumption of lime 1,8%	61	10	3,48	25	
	102	15	5,37	25	
	142	20	7,16	25	
	188	25	8,95	25	
	225	30	10,74	25	
	274	35	12,53	25	
	318	40	14,32	25	
	431	50	17,40	32	1,2
	534	60	21,48	32	1,2
	594	65	23,27	36	1,2

*The numbers correspond to the numbers of the investigations.

Table 2. Analysis of the filtrates.

	Cold diffusion purification with 0.3% of lime in total.	Hot diffusion purification with 1.8% of lime in total.
Polarization	10.5%	11.6%
Brix	12.5°	13.1°
Alcalinity	65 mg CaO/100 ml	67 mg CaO/100 ml
Extinction/cm 4300°A and pH f.	0.502	0.255
pH	10.6	10.6
Amount of lime salts in the filtrates after "second" carbonation to p_H 8.5 and filtration	61,8 mg CaO/100 ml	12,4 mg CaO/100 ml

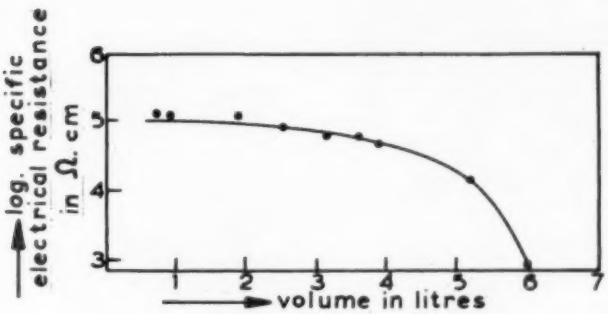


Figure 3.

Logarithm of the specific electrical resistance of a sample of 50 ml from the percolate plotted as a function of the volume, which had been percolated before the sample was taken. The percolate in question had passed the cation exchanger and the anion exchanger.

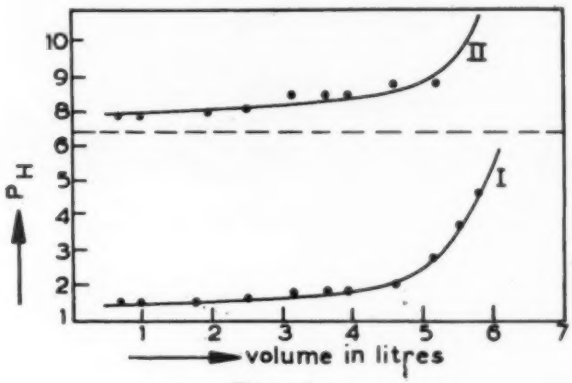


Figure 4.

pH of the percolate as a function of the volume which was percolated before the sample (50 ml) was taken. Curve I represents the pH values of the effluent from the cation exchanger. Curve II represents the pH values of the juice which has passed both ion exchangers.

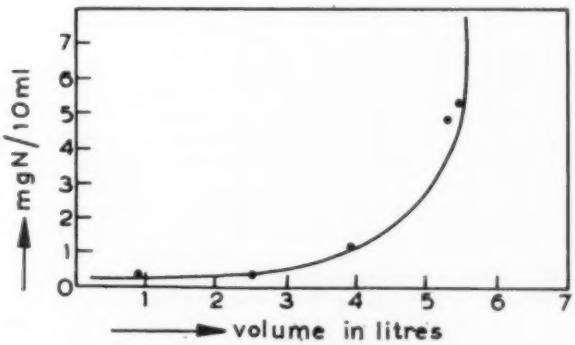


Figure 5.

Nitrogen content of the juices, which have passed both ion exchangers, plotted as a function of the volume which was percolated before the sample (50 ml) was taken.

pletely white sugar is obtained after removal of the water by evaporation. Analysis of the sugar gave the following results.

Polarization	**99.5 %**
Invert sugar content	**0.2 %**
Ash content	**0.31%**

Following this procedure no syrups or molasses are obtained.

The regeneration of the ion exchangers after having been exhausted was carried out according to instructions. Although we have not yet determined exactly the duration of life of the ion exchangers it seems there is no decrease in capacity after many cycles of percolation and regeneration.

Bulk Futures Contract Being Formulated

As a result of the accelerating trend toward bulk sugar deliveries to American ports, the New York Coffee & Sugar Exchange is creating a bulk futures contract according to Charles S. Lowry, president of the Exchange. Under provisions of Raw Sugar Contract No. 6 (domestic), futures trading on the Exchange is confined to sugar shipments in bags. Due to the economies that can be realized from shipment of raw sugar in bulk, industry officials estimate that not less than 50% of the sugar received at U. S. ports arrives in bulk and they predict that this trend will continue at an accelerated rate. Volume of trading under Contract No. 6 has dwindled by 70% in the past seven years. Mr. Lowry pointed out that this downward trend is not due entirely to the changeover from bag to bulk deliveries although this is an important factor; part of the shrinkage is due to rigid government controls which discourage traders from entering a market in which the rules governing supply and demand can be changed at will by government fiat.

Announcement of the new contract was made in the Board of Managers 77th. annual report to the membership. It was also announced that there were 37 new members in 1958 compared with 32 in 1957, that sales prices of memberships in 1958 ranged from $4,000 to $5,900 compared with a range of $3,500 to $8,250 in 1957.

The new contract will be submitted to the membership for approval in the near future.

■

Henry H. Feldstein

Henry H. Feldstein, chief engineer of Sugar & Chemical Machinery, Inc., died suddenly on Jan. 2, 1959, in Cleveland. Feldstein had obtained his engineering degree in 1913 from the Polytechnical Institute Emperor Alexander II at Kiev. Three years later he emigrated to America and was employed in a variety of engineering work until 1919 when he joined the Kilby Mfg. Co. of Cleveland as assistant engineer. Upon the death of Engineer Grill, Feldstein succeeded to the management of the engineering department.

When the Kilby Mfg. Co. discontinued business in 1948, Feldstein joined with plant superintendent Peter Ragborg and sales engineer John Laing in the organization of Sugar & Chemical Machinery, Inc. Their business is to serve as consultants and constructors to sugar companies and as suppliers of all manner of equipment.

Feldstein was a mathematical genius and enjoyed great popularity among sugar craftsmen for his generosity in the interchange of ideas. DAN GUTLEBEN

The C & H Crockett refinery where the new mechanical palletization facilities move sugar from the refinery at left center to the palletization area located near the center of the L-shaped warehouse at right.

Automatic Palletization Facilities at Crockett

THE largest and most comprehensive mechanical palletization facilities in the country have been installed by California and Hawaiian Sugar Refining Corporation at their Crockett refinery. The $1,600,000 installation conveys packaged sugar from refinery to warehouse, mechanically sorts various size bags and cases, automatically loads pallets and automatically dispatches the loaded pallets to any one of four different destinations for storage or shipment.

In 1954 C&H engineers, working with the Lamson Corporation, developed designs for a special pallet loader capable of handling 60 in. by 44 in. pallets with loads up to 4,500 lbs. This special loader, tested over a number of months, demonstrated, that with modification, successful mechanical palletization of all C and H packages, including shipping cases, paper bales, and paper bags, was feasible.

In March, 1956 a final plan was selected for installation of the facilities in two phases. The first, designed to handle all major shipping case items and all 60-pound bales, was completed in the Spring of 1957. The second, designed to handle 25-, 50-, and 100-lb. bags, was completed in the summer of 1958.

All 50 and 100-lb. bags enter the sorting station on a common conveyor belt. The operator identifies each container as it passes, presses a button designating an accumulator line for that particular item. General Electric static control system is partially visible in the background.

At present, the entire packaged output of the refinery (excluding some specialty items) or about 600,000 tons of sugar per year, is being handled by the mechanical palletization facilities. This means that the system mechanically palletizes about 120,000 production units every 24 hours.

Operationally, the facilities include three integrated systems for handling the major types of packaged sugar. The packaged output of the refinery is divided into these general classifications:

1. Shipping cases containing consumer cartons of various types of sugar.
2. Paper bales enclosing from six to thirty paper pockets of granulated sugar.
3. Various types of sugar bulk-packaged in 25-, 50-, and 100 lb. paper bags.

Shipping cases of packaged sugar, with a net weight of 24 to 60 lbs., are conveyed from various production stations and accumulated by type on four lines of live-roll conveyors. As the lines fill up, the cases are directed automatically into either or both of two mechanical palletizers which build up

Live roll conveyors accumulate pallet loads of bags and feed the containers into the pallet loaders (left). At right, bales containing six 10-lb. pockets are shown being formed into an interlocking layer pattern on a pallet loader.

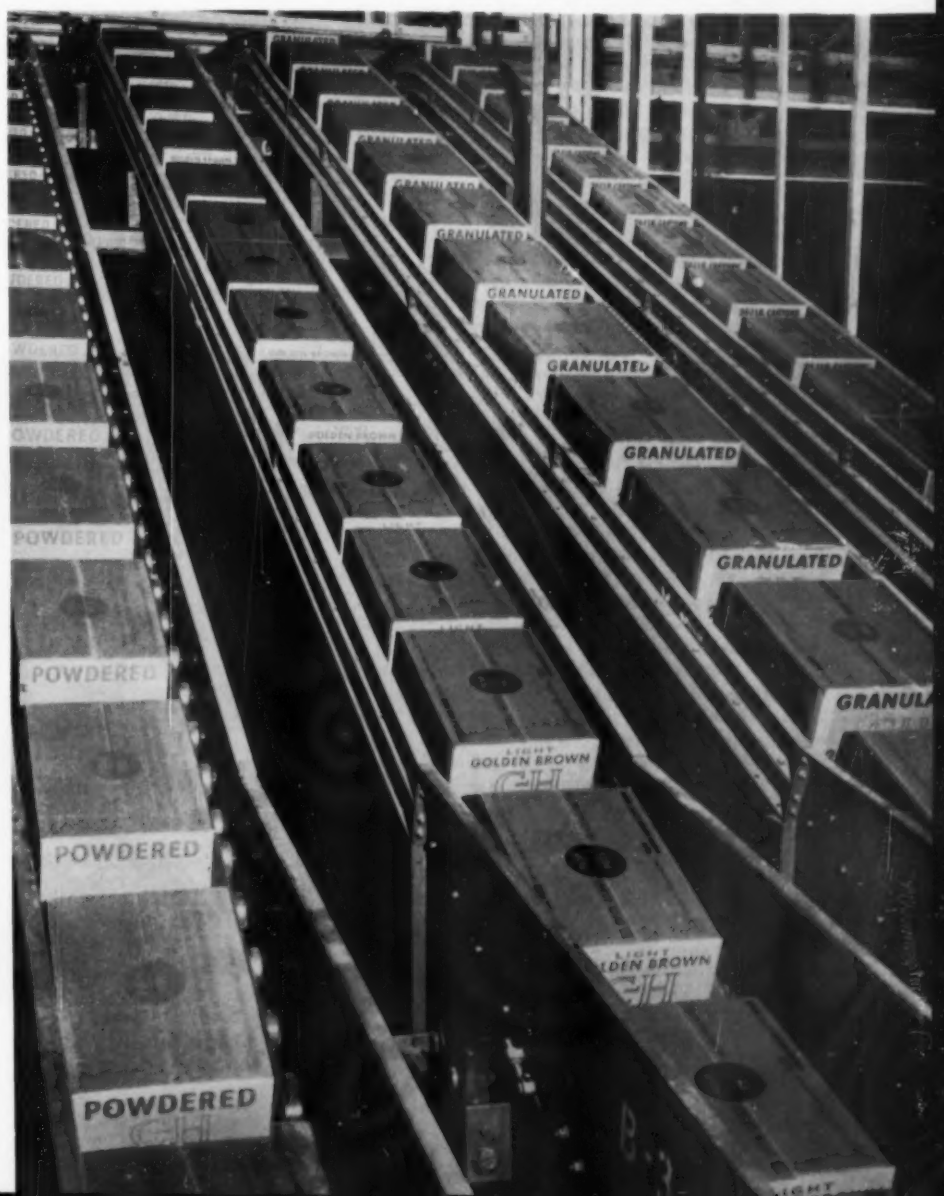
successive layers of cases into pallet loads, according to pre-set patterns. Palletizing rates for cases vary from 30 to 35 cases per minute, depending upon their size and pallet pattern.

Paper bales weighing 60 lbs. and containing 12 five-pound consumer units or six ten-pound units of granulated sugar are conveyed directly from production to three mechanical pallet-loaders. Two of these loaders are in full use, while the third is maintained for standby purposes and for palletizing other items such as bales of thirty two-pound units or six ten-pound cloth bags. The pallet loaders palletize bales at a rate of about 25 per minute.

The system for palletizing paper bags is necessarily more complex. The mechanical palletization of 25-, 50-, and 100 lb. bags was actually pioneered in the C and H installation. All 50- and 100-lb. bags pass through a sorting station en route from production to pallet loaders. Sorting is controlled by a General Electric static control system and an operator at a console. The operator signals the identity of each bag, and bags are automatically routed to any one of six accumulator lines by the static control system, at rates up to thirty bags per minute. As each bag reaches its pre-selected transfer point on the live-roll conveyor, it is automatically transferred to the correct accumulating conveyor by means of continuously running V-belts positioned between the rolls of the main trunk line.

There are ten bag accumulating lines feeding into three pallet loaders. Six of these ten accumulating lines operate through the sorting station: there are four bag lines running directly from production. These include two 25-lb. bag lines. Bags are held on the accumulator lines until there are sufficent quantities to form pallet loads. The bags are directed automatically into one of the three pallet loaders previously designated to handle a particular item. Palletizing rates for bags are: about 30 bags per minute for 25-lb. bags; about 25 per minute for 50-lb. bags; and about 20 per minute for 100-lb. bags.

The eight pallet loaders are installed in a centrally located area on the second floor of



Four different case items are shown on metering lines which count the units and make up the pallet loads fed into the automatic loaders.

Pallet loader in operation on bales. Chain conveyors transfer loaded pallets to a common conveyor. Note empty pallets being delivered to the magazine at the rear of the loader where eight pallets can be stored.

the warehouse. About 7,300 feet of the new conveying equipment was installed to bring packaged sugar from packing stations on the second, third, and fourth floors of the refinery to the pallet loaders over a system of conveyors and accumulating lines. The majority of sorting and accumulating lines are suspended from roof trusses, about 40 feet above first-floor warehouse storage areas, thus utilizing space that was formerly wasted. Five pallet loaders handling bales and cases and three bag pallet loaders face each other on opposite sides of a common loaded pallet conveyor. Stacks of empty pallets are brought to the palletizer floor by automatic elevator and moved by fork truck to empty pallet storage magazines in each pallet loader.

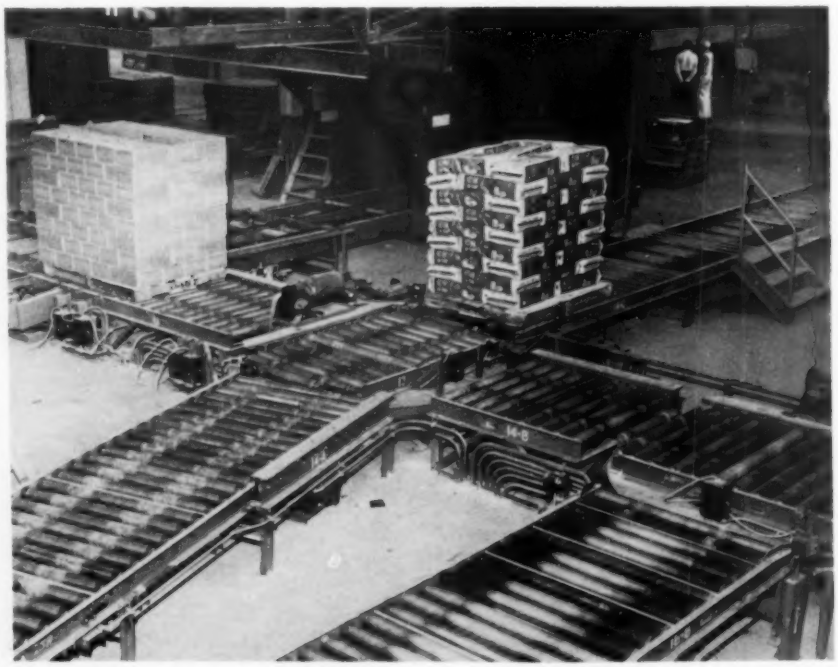
As packaged items flow into the pallet loaders, they are formed into properly interlocked layers by the action of a rotating pin and a ram controlled from a pattern cartridge. A stripper plate then retracts from under the layer, and the layer of packages drops a few inches onto the waiting pallet which is supported from below. This action is repeated for successive layers until a full pallet load is formed and discharged. An empty pallet for the next load is fed into loading position automatically.

Loaded pallets of shipping cases, bales, and bags are transferred automatically from the eight pallet loaders onto a common loaded pallet handling conveyor. The station operator can select any one of four final destinations by pre-setting a switch at each loader. The control system remembers the destination for each loader and even for different items on one loader. Loaded pallets are directed over the main line conveyor through turntables to a destination on the pallet loading floor, or to any one of three elevators which lower loaded pallets to the first floor. Loaded pallets are accumulated at these four points and picked up by fork truck for delivery to storage, or to loading points for rail, truck, or water transportation.

Since the mechanical palletization facilities form an outlet for the major packaged output of the refinery, a failure of the system would require the return to costly manual palletization. An emergency hand-palletization station has been provided for this possibility. The patience, vision, and engineering skill of those involved have been rewarded by the fact that to date the emergency station rarely has been used except for test purpose or while modifications have been made to the mechanical system.

In addition to the more obvious materials handling economies achieved by the facilities, a number of other benefits have been obtained. Previously damage to packaged sugar during hand palletization resulted in costly rehandling and increased container costs. These costs have been reduced considerably by mechanical palletization. More uniform and better balanced pallet loads have been achieved permitting better stacking and more efficient storage. Easier and more flexible production scheduling also has resulted. Mechanical devices involving higher skills have been substituted for heavy manual labor with its attendant risks and employee relations problems.

Loaded pallets move along a live roll conveyor from upper left to one of two turntables either of which can direct the loaded pallet to right or left for a total of four ultimate destinations. First turntable, which has switched a loaded pallet to the left, may be seen at center.



Sugar's Progress in

HUMAN RELATIONS

Roy J. Leffingwell

Human Relations Program in Taiwan Sugar

CHINA may not be the place you would expect to find the world's most progressive program to gain the cooperation of sugar farmers, but I have never seen better.

The Chinese regained the Island of Taiwan (formerly Formosa) in October 1945 after 50 years of Japanese occupation. Most of the mills had been bombed out in World War II and production was down to some 30,000 tons from the record outturn of 1,500,000 tons. Four years later the mainland of China fell to the Communists and more than two million refugees fled to Taiwan.

A land reform program split big acreages into small individual farms. Growers were free to produce what they wanted to. This helped the farmers who found rice a more remunerative crop but played havoc with the sugar industry.

The Taiwan Sugar Corporation, which is the largest single sugar manufacturer in the world, created progressive policies and launched an effective communication campaign to let the farmers know about the merits of sugar production. One device was the creation of the Taiwan Sugar Cane Farmers Assn., now in its fourth year.

The association aims to get 150,000 cane growers as members. Membership involves an agreement to produce cane. Now, the association is about at the half-way mark and growing rapidly.

To attract members in such great numbers they have a program with eight major features:

INSURANCE: Birth to death, disability, and retirement policies are provided, without cost to the farmer, based on acreage planted to cane.

LOANS: Money can be borrowed for living expenses, land improvement, pig and poultry development, etc.

GENERAL SERVICE: Scholarships, vocational training, and medical service through a touring hospital, are available at cost.

AGENT FOR FARM PURCHASES: Any supplies can be secured through the association, and installment terms arranged.

TECHNICAL GUIDANCE: New cane varieties and pest control help are examples of this service.

INFORMATION SERVICES: Material on practically any farm problems can be obtained.

VETERINARY SERVICES: Help is available from veterinarians of the association for pig, cattle and poultry programs—which are designed to supplement the cane growers income.

REDUCED PRICES ON TAIWAN SUGAR BY-PRODUCTS: Members are given a substantial discount on cattle feed and other by-products of the sugar corporation.

Experienced public relations personnel have been employed to sell this program. They have used practically every communication medium. One of the most effective means of reaching the farmers has been a number of color film strips, synchronized with tape recordings in the dialect of the particular region.

Few, if any, sugar areas in the world have undertaken such a progressive and well organized program to sell sugar cane production to independent farmers.

Profit Sharing Makes Money

Getting more production for less money is the goal of all good managers. This is becoming of increasing importance due to higher wages and materials — and lower sugar returns.

A system of sharing the profits with employes has produced phenomenal results where it has been given an honest try. So popular have such plans become that in the United States alone more than 20,000 companies, employing some two million people, have these systems in operation.

George Elliott Company, a New York consulting firm, recently surveyed 2,500 of the profit sharing plans being used in 29 different industries. It was found that productivity increases of 39% to 100% had been made since the plans were installed. The average increase was 63.55%.

Companies using these plans cut unit labor cost by anywhere from nine to 59%, for an average of 25.91%. But workers also shared well under the plans. Their take home pay was higher by nine to 39% for an average of 20.6%

For every one per cent increase in wages earned by the worker, the companies using the plans averaged a production increase of 3.1% and costs were cut by 1.25%.

Sharing the profits has always been at the root of most labor-management problems. Some organized system of sharing appears to be the most effective way to tackle this difficulty. The idea is not new, but it is growing rapidly. Every organization hiring workers may, in time, be forced to use such a system.

Lihue Plantation Co. in Hawaii has a successful safety contest underway. Each month, one safety rule of the company is published in their employe newspaper. The company puts up $25 to defray the cost of the award.

The names of two employes are drawn from departments which have had no lost-time accidents for the month. The lucky winners are brought into the office and asked what the safety rule for the month is. They do not need to memorize it, only have a working knowledge of the rule.

If both of them know what the rule is they split the money. If only one knows, he keeps all. However, if neither knows, the money is added to the pot for the next month.

Several months have passed since there has been a winner, and the money is adding up.

The largest single basic wage increase since 1952 was awarded Australian sugar workers last year. The increase amounted to some U. S. 60 cents per week for adult males and about 45 cents for adult females. The increase was based upon higher costs of living.

Spanish immigrants have recently been taken into Australia, as they were considered men suitable for cane cutting in the Queensland cane fields.

The Hawaiian Commercial & Sugar Co. on the Island of Maui is going to publish a series of case studies of actual problems in employe relations, for instruction of their supervisors. The case method is being recognized today as one of the most effective means of human relations training.

Case reports are written up as accurately as possible from reports submitted by those involved. Purpose of the case studies is to help supervisors avoid common industrial errors in dealing with employes.

Company pension plans, health and welfare benefits and other forms of private social security, are keeping workers in the United States bound to their jobs as never before. Before World War I, the quit rate averaged six per cent per 100 employes per month. In 1957 the rate was down to 1.4 quits per 100 employes per month.

Experience At Central Zaza

Checking Corrosion In Evaporator Tubes

By Engineer Ubaldo Villar

When the writer came to Central Zaza in Cuba, the first instructions he received from the management was to find a solution for a serious corrosion problem affecting the copper calandria tubes of the existing quadruple effect, especially in the fourth or "syrup" effect. During the recent years the corrosion of this equipment had increased to such an extent that in the crop of 1953 it was necessary to replace 548 tubes, and it was happening that new tubes put in during one year had to be taken out the next year. Inspection of the vessels invariably showed that the tubes were mostly damaged, and especially in the zone immediately below the upper plate of the calandria. Naturally, the first thing to be done was to determine the cause of the trouble. Three hypotheses came into consideration: corrosion as a result of galvanic action; corrosion due to hydrochloric acid during periodical cleaning operations; corrosion due to non-condensable gases particularly ammonia.

Galvanic corrosion can occur only in two cases; one is where there are closed galvanic circuits, due to the presence of two metals of different electrochemical potentials submerged in a solution containing one or more electrolytes and connected by a metallic conductor. This situation does not exist in the common calandria. The other case of galvanic corrosion arises when there is a notable irregularity in the internal structure of a metal different parts of which have been subjected to violent mechanical handling, such as may occur in handling, welding or soldering, and are bathed in solutions containing electrolytes. This case also does not occur to any appreciable extent in sugar factory calandrias.

Typical deterioration of the calandria tubes prior to modifications that permitted ready escape of the non-condensable gases.

In the theory of corrosion by the acid used in cleaning operation, this is thought to be due to acid vapors that take some time to pass through the narrow area adjacent to the escape valves for the non-condensable gases. Against this idea it may be considered that hydrochloric acid does not attack copper unless an oxidizing agent is present in the calandria, and even in that case it is hard to imagine that much corrosion could occur during the 12 cleaning periods that are necessary during an ordinary campaign. And even supposing the presence of an oxidizing agent capable of activating the hydrochloric acid, it is difficult to explain why the corroding effect is most evident in the fourth or syrup, and much less in the third, still less in second and least in the first effects.

With these theories eliminated, there remains the theory that the corrosive action is to be ascribed to the non-condensable gases, which is supported by the following considerations:

1. Location and form of the attack. Examination of the interior of the calandria shows that the damage is invariably confined to the upper third of the tube in the zone immediately adjacent to the upper plate of the calandria. Here appear characteristic crevices or cracks that always begin at the top of the tube and from thence extend downward. From this it is concluded that these streaks of corrosion are due to the continuous action of ammonia dissolved in the film of condensate which trickles down the tube.

2. Most damage occurs in the fourth effect. As previously mentioned, the corrosion is the most extensive in the fourth effect; it occurs to a lesser extent in the third effect and is hardly noticeable in the first effect. This increase of corrosion from the first to the fourth effect is satisfactorily explained by the fact that the non-condensable gases gradually increase in quantity as the juice becomes more concentrated, and its capacity to hold the gases in solution diminishes.

3. The extent of calandria corrosion is correlated with use of nitrogen for fertilizing the sugar cane in the fields. Application of nitrogen fertilizer to the cane fields that supply this factory began in 1944; by 1949 some 85% of the cane area was receiving such fertilizers, and this has been continued except for the years 1954 and 1955 when, due to restrictions on production and an excess of standing cane, the fields received little fertilizer. Since one of the fertilizing materials used was potassium nitrate, it may be supposed that the cane juices contained a large proportion of amino acids; these acids under the influence of elevated temperatures produce ammonia gas; the consequence has been that the more nitrogenous fertilizer was used, the greater was the damage to calandria tubes; the two phenomena are evidently closely related.

4. Ammonia gas is known to corrode copper. It is well known that ammonia does corrode copper, and one of the strongest reasons for regarding the non-condensable gases as the cause of the damage in question is the fact that the attack is most in evidence at the tops of the tubes below the upper plate of the calandria, at the place where the tubes are bathed by the ammoniated vapors. These gases, due to their low gravimetric density, collect in the upper part of the calandria vapor space, where they are redissolved in the condensate and thus constitute a corrosive liquid.

5. For an efficient extraction of the non-condensable gases, in the design of a calandria, whatever may be the system of arranging the interior diaphragms it is of much importance to assure an efficient and complete extraction of the non-condensable gases, because these gases not only exert a destructive action on the tubes, but also tend to form local pockets at various places where they interfere with heat transfer and thus reduce the evaporating efficiency of the unit.

Having been convinced by the foregoing considerations that the cause of the deterioration of the tubes is due to retention of the non-condensable gases in the calandria, we began to investigate the reason why these gases were being incompletely evacuated, and we found the following:

The six lower tubes of the fourth or "syrup" effect, forming a continuation of the "spider legs" which were used for extracting the gases and connected in regular order with the upper calandria plate, were of the "perforated type"' that is, they had

small openings at different levels but had the disadvantage that on the upper section these openings were placed six inches apart. The consequence was that extraction of the gases was inefficient, and there always remained a thick layer of gas that could escape only with difficulty, and all the while was damaging the tubes. See Fig. 1. The section of the common outlet tube where the six "spider legs" converge was too narrow for complete removal of the gases, especially during the years when the fields were being liberally treated with nitrogen fertilizers.

The destructive action in the syrup effect was most apparent in the region opposite the vapor inlet (see Fig. 1); that is, the tubes in this region deteriorated the most. It may be noted that the calandria of this effect was without interior baffles, and thus the gas-containing vapor was not being properly oriented. For this reason the gases tended to accumulate in this zone in the form of large pockets that could not be evacuated properly.

The valve on the tubing for the non-condensable gases coming from the third effect was very narrow. This tubing was connected with the cupola of the syrup effect.

All this led to the firm conviction that the trouble was due to the inefficient and inadequate extraction of the non-condensable gases. To remove this difficulty the following operations were carried out.

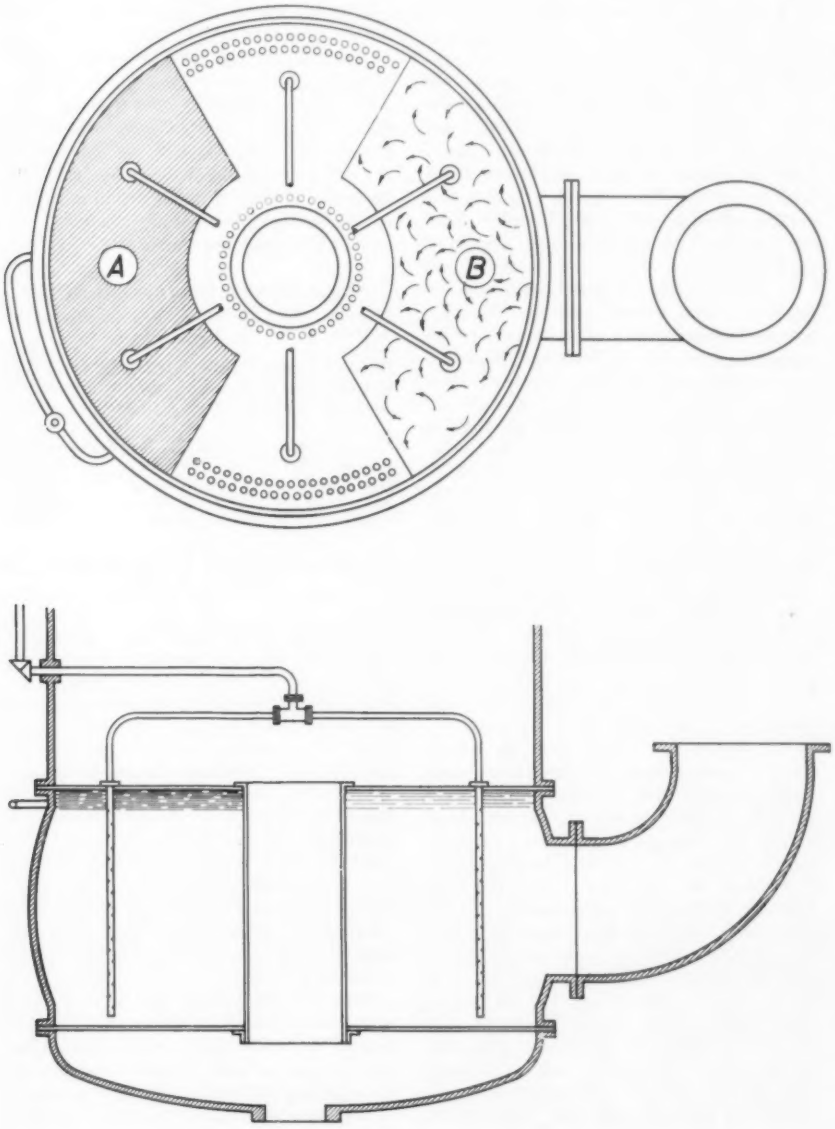
1. Suppression in 1954 of the six lower perforated tubes of the syrup effect that were connected with the upper calandria plate. This removed any possibility for the accumulation of a layer of gas.

2. During the repair period corresponding to the 1955 crop there was installed an auxiliary outlet as shown in Fig. 1. It will be seen that this new outlet is located in the zone where the gases concentrate and cause the most destruction. This tubing is connected with the vapor line between the syrup effect and the condenser.

3. Large valve openings were provided in the gas outlet lines of the third and fourth effects.

How well these efforts have paid off is eloquently shown by the following comparison: the number of tubes replaced during the years 1952, 1953, and 1954 were: 188, 548 and 18, respectively. The corresponding figures for 1955, 1956 and 1957 were: 17, 5 and 5. During the 1958 campaign up to March 18th no tube had to be replaced.

Figure 1: "A" represents the zone of maximum concentration of gases in the calandria on the upper cross section of the vessel; "B" is the zone of maximum turbulence. In the upper diagram the tubing at the lower left provides an additional outlet for the non-condensable gases that were the cause of tube deterioration. The lower diagram illustrates a side elevation of this section of the vessel.



■

Beet Technologists To Meet in Salt Lake City

The American Society of Sugar Beet Technologists will meet at the Hotel Utah in Salt Lake City, Utah on February 2 through 5, 1960, just twelve months hence. The general program chairman for the meeting is Ralph Wood, Great Western Sugar Company, Experiment Station, Longmont, Colorado. Chairmen for each of six sections are:

AGRONOMY: (A) Mark R. Berrett, Director of Research, Farmers & Manufacturers Beet Sugar Association, Second National Bank Bldg., Saginaw, Michigan.

GENETICS & VARIETY IMPROVEMENT: (B) George E. Rush, Plant Breeder, Amalgamated Sugar Company, Nyssa, Oregon.

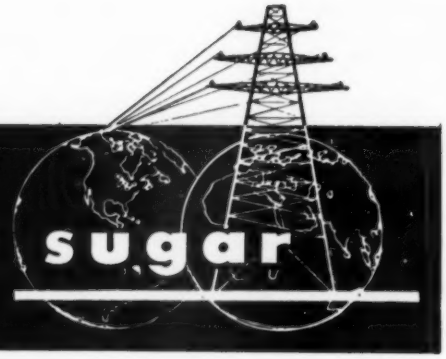
ENTOMOLOGY & PLANT PATHOLOGY: (C) Dewey Stewart, Head, Sugar Beet Section, U. S. Department of Agriculture, Beltsville, Maryland.

AGRICULTURE ENGINEERING: (D) Roy Bainer, Department of Agricultural Engineering, University of California, Davis, California.

CHEMISTRY & FACTORY OPERATION: (E) R. M. McCready, Chemist in Charge, Sugar Beet Unit, Western Utilization Research & Development Division, 800 Buchanan Street, Albany 10, California.

PHYSIOLOGY: (F) J. L. Haddock, Soil Scientist, U. S. Department of Agriculture, Utah Agricultural Experiment Station, Logan, Utah.

facts about sugar



NEW YORK, JANUARY 14, 1959:—The fall of the Batista regime caused both U. S. and world raw sugar prices to drop sharply. B. W. Dyer & Company, Sugar Economists & Brokers, report.

While the rebellion continued, the Cuban crop was endangered and world (#4) spot prices advanced to $3.67 per 100 pounds the latter part of December. However, after Batista fled, the world price declined to $3.25 by January 13th. The domestic (#6) spot price declined from $6.00 per 100 pounds at the end of 1958 to $5.63 on January 9th. However, it advanced to $5.65 on January 13th.

The new Cuban cabinet approved a decree restricting 1959 sugar production to 5,800,000 Spanish long tons (6,587,640 short tons). Under Batista, Cuban production for 1959 had been set at 5,900,000 Spanish long tons (6,701,220 short tons), while in 1958 final production was 5,610,029 Spanish long tons (6,371,871 short tons).

Under the new decree the following quotas were designated: U. S. free, 2,179,011 Spanish long tons (2,465,000 short tons); U. S. Reserve 500,000 Spanish long tons (566,000 short tons); Other Countries free, 1,500,000 Spanish long tons (1,715,000 short tons); Other Countries reserve, 600,000 Spanish long tons (681,000 short tons); Stabilization Institute, 100,000 Spanish long tons (115,000 short tons); Voluntary Reserve, 278,020 Spanish long tons (315,000 short tons); Obligatory Reserve, 292,969 Spanish long tons (332,140 short tons); Local, 350,000 Spanish long tons (398,500 short tons).

Damage in Oriente Province resulting from the rebellion was estimated at less than $5,000,000. Normal production has been anticipated by the Castro regime, and, as of January 13th, one mill had started grinding and several others were cutting cane.

Under the new regime, Jorge Barroso was dismissed from his post as head of the Sugar Stabilization Institute, and the government member, Lopez Castro, was replaced by Alberto Fernandez, a sugar planter. The tax of $0.15 per 250 pound bag of sugar levied by Fidel Castro was scheduled to remain in effect, while the $0.10 tax assessed by Batista was annulled.

Cuban sales to the world market through December 31, 1958 of sugars for shipment in 1958 totaled 2,514,057 English long tons (2,815,744 short tons), raw value, according to a survey by Willett & Gray, Inc., compared with 2,642,958 tons (2,960,113 short tons) in 1957.

Dominican Republic sugar may be delivered during March 1959 and thereafter under the #4 contract in licensed warehouses in the ports of Barahona, Ciudad Trujillo, Haina, La Romana, Puerto Plata, San Pedro de Macoris. This action was uanimously approved by the Board of Managers of the N. Y. Coffee & Sugar Exchange on December 22, 1958.

U. S. cane refiners and beet processors announced that a $0.20 per 100 lbs. price advance would become effective in the Chicago-West territory on December 18th, but, prior to that time, one of the beet processors announced that it would continue at the old ($8.65) price through January 9th. A $0.10 increase to $9.25 was declared effective by cane refiners in the South on December 16th but business was taken at the old price for delivery by December 30th. In the Southwest, a $0.20 increase to $9.05 became effective December 18th.

U. S. sugar quotas totaling 9,200,000 short tons, raw value, for 1959 were announced by the Department of Agriculture on December 29, 1958. In making the announcement it was stated that refined sugar distribution during the 12 months ended October 31, 1958 amounted to 8,970,000 short tons, but invisible inventories (those held by wholesalers, retailers and industrial users) expanded about 100,000 tons during that period and actual consumption was correspondingly less. Distribution in 1959 may approximate 9,050,000 tons, if there is no appreciable change in "invisibles" during the year. Also in determning requirements, 50,000 tons must be added to distribution for excess refining losses. Refiners' inventories of quota sugar at the end of 1958 are expected to be higher than a year earlier, but all the increase will occur in the Gulf area because of new-crop Mainland Cane sugar. Considering the recent (December) market strength and supply uncertainties, it was deemed desirable to provide fully for 1959 needs. Quotas are as follows (in short tons, raw value):—Domestic beet 1,998,717; Mainland Cane 615,024; Hawaii 1,115,479, Puerto Rico 1,166,375; Virgin Islands 15,905; Philippines 980,000; Cuba 3,060,475; Peru 86,867; Dominican Republic 71,557; Mexico 54,609; Nicaragua 12,879; Haiti 6,597; Netherlands 3,592; China 3,505; Panama 3,505, Costa Rican 1,123; Canada 631; United Kingdom 516; Belgium 182; British Guiana 84; Hong Kong 3; All Others 0.

In view of the end of the Cuban rebellion, the initial 1959 U. S. quota should more than cover foreseeable domestic needs, B. W. Dyer & Company, concludes.

Sugar Prices January 13, 1959

Ex. Duty Raw Sugar N. Y.	**5.65**
Average #6 Raw Sugar Jan. 1 to Jan. 13	**5.73**
Refined Sugar Gross N. Y.	**9.35**
#4 Raw Sugar (f.o.b) Cuba	**3.25**
Average #4 Sugar Jan. 1 to Jan. 13	**3.31**

Future Prices	*Contract #6*	*Contract #4*
March 1959	**5.61**	**3.27**
May 1959	**5.63**	**3.26**
July 1959	**5.72**	**3.26**
September 1959	**5.77**	**3.26**

Puerto Rican Technologists Annual Meeting

SAN JUAN, JANUARY 2, 1959:—The annual meeting of the Association of Sugar Technologists of Puerto Rico was held at the Hotel Caribe Hilton in San Juan on the 5th and 6th of December, during which some interesting subjects related to agricultural automation and industrial engineering came up for discussion. About 200 technologists from the Island and abroad attended the meeting to hear and discuss the papers that were presented. A much appreciated feature was distribution of the special November edition of SUGAR Y AZÚCAR that contained the program of the meeting, an outline of the principal subjects, and a summary of the technical papers.

After the welcoming address by F. González Mandry, dean of the Engineering College at Mayaguez, the assembly divided into two groups: agriculture and manufacturing, for separate treatment of the special phases of the industry. Among the themes of prin-

cipal interest were: the modified Louisiana system of cane planting, mechanical loading for transporting the cane, maintenance of agricultural equipment, industrial engineering as applied to agricultural tasks, handling of mechanically loaded cane, vacuum pan operations in handling the juice of mechanically harvested cane, cane-washers in Puerto Rico, and prospects of the sugar industry of Puerto Rico.

During the banquet which closed the meeting Mr. Manuel A. del Valle, president of the P. R. Sugar Producers' Association gave some details about the Association's proposition to establish a sugar refinery in Virginia. A resolution was passed to send two delegates to the meeting of the International Society of Sugar Cane Technologists in Hawaii during 1959; another resolution was passed to invite the Society to hold its 1962 meeting in Puerto Rico. A third resolution was passed providing that future meetings of the Association be held for a duration of three days in order to have more time for the discussion of important matters.

Officers of the Association for 1959 were elected as follows: President, Harold E. Willet (reelected); Vice president, Carlos Haeussler; Treasurer, Miguel V. Capplouch (reelected); Secretary, Rafael Hilera. In addition, presidents were elected for the sections of agronomy, economics, engineering, chemistry, and by-products.

The legislature of Puerto Rico has been called into special session for the sole purpose of considering compensation for the longshoremen and sugar factory workers who have been thrown out of work by the practice of shipping sugar in bulk. At that session the legislature approved a law authorizing the Secretario de Hacienda to allocate $1,100,000 to be paid workers affected by the new shipping practice, which is now being used by all the sugar mills of the Island. Under another law, some 4,000 workers will be eligible to receive compensation amounting to 50 cents a ton for each ton of sugar shipped in bulk; this contribution will be levied on the mill owners. However, this levy will be postponed on account of the crisis through which the sugar industry is passing, due to the cyclone of 1956 and the extreme drought of 1957.

A group of Puerto Rico agriculturists, officials of the Department of Agriculture and Commerce, and members of P. R. legislature will visit Louisiana to make an intensive study of the agricultural and other phases of the sugar industry in the state. On their return the results of these studies will be reported to a meeting to be held at the Agricultural Experiment Station of the University of Puerto Rico for comparison with conditions existing in Puerto Rico.

The Sugar Producers' Association has collected data from the Island's sugar centrals which indicate that if the coming harvest is a normal one, Peurto Rico should produce about 1,203,576 tons of 96° Sugar.

Negotiations between the Association of Sugar Producers of Puerto Rico and the Sindicato Azucarero on the signing of a new contract have come to a deadlock. The Mediation and Arbitration Board of the Department of Labor has been called on for an effort to reach an agreement. The harvesting can not begin until a contract has been signed. It is expected that this situation will delay the start of the harvest at the mills that have not signed.

Philippines to Urge Increase in Sugar Quota

MANILA, PHILIPPINES, DEC. 26, 1958:—With the assurance of no less than President Eisenhower that due consideration will be given to the Philippine sugar industry when the U. S. Sugar Act comes up for review, various elements of the sugar industry here will seek participation in the increase over the basic quota, authoritative sources disclosed.

Earlier, a dispatch from Washington said Philippine Ambassador Gen. Carlos P. Romulo said the Philippine government will seek a larger quota for the sale of sugar to the U. S. Ambassador Romulo also said that the Philippines is not satisfied with its present allotment in the U. S. market, amounting to 900,000 short tons yearly.

Romulo also recounted the fact that the Philippines sugar industry suffered heavily during World War II and did not recover immediately from the ravages of war, so that the Philippines did not supply any substantial portion of the U. S. market for several years following the war. In spite of this, the Philippines filled its quota for 1958 and four of the last five years.

A 100% representation of all sectors of the Philippine sugar industry is expected at the forthcoming IXth Congress of the International Society of Sugar Cane Technologists to be held in Honolulu from May 3 to 23rd this year. Representatives of planters and millers as well as sugar traders will attend this conference.

Among the organizations sending delegates to this international conference are the Sugar Quota Administrator, National Federation of Sugar Cane Planters, Philippine Sugar Association, Philippine Sugar Institute, and private firms, directly or indirectly connected with the Philippine sugar industry.

Management and control of one of the largest sugar centrals in the world passed from Spanish to Filipino hands with the purchase of Central Azucarera de Tarlac by Don Jose Cojuangco, prominent rice and sugar magnate. (This transaction came close on the heels of a similar one, involving the Pampanga Sugar Mills, an American-owned central, which was acquired by the Binalbagan-Isabela Sugar Co. (BISCOM), a Filipino enterprise).

Don Pepe, as the new owner is popularly called, jointly owns and operates with his brothers the Paniqui Sugar Central. The Cojuangcos dominate the sugar industry in the province of Tarlac, 75 miles north of Manila.

Management of the Central Azucarera de Tarlac will be carried along modern lines, it was also known.

As a special service to their members, particularly in the Visayas and Mindanao area, the National Federation of Sugar Cane Planters and the Sugar Producers Cooperative Marketing Association have jointly sponsored a radio program over Station DYXL in Bacolod City to keep their members posted on the modern developments in agricultural methods and marketing systems. Both associations represent more than 95% of the Philippines' sugar producers.

Daily broadcasts of current prices for the different classes of sugar will be made to guide producers in selecting the "most appropriate time" at which to dispose of their stocks.

Manuel Elizalde was recently re-elected president of the Philippine Sugar Association. Also re-elected were: G. H. Wilkinson, 1st vice-president; Carlos Rivilla, 2nd vice-president; Ernesto Escaler, 3rd vice-president; A. R. Dampierre, 4th vice-president; J. Amado Araneta, 5th vice-president; and Jose E. Romero, secretary-treasurer.

Hawaiian Strike Damage To Affect 1959

HONOLULU, DECEMBER 29:—Losses in the 126-day strike by sugar workers against the Hawaiian sugar industry a year ago are still being felt. Over 300,000 tons of production were lost in the year of the strike, but as Hawaii has a two year cane crop the losses will continue. As one example, Ewa Plantation Company has notified stockholders that they do not believe results will be any better in 1959 than the previous year. Their 1958 production was about 27,000 tons—down from a normal 60,000 ton crop.

Ewa was the hardest hit of the Hawaiian plantations because their property is on an arid area in which continuous irrigation is imperative. It can be expected that the unirrigated plantations on the Island of Hawaii may have little carry-over losses this year, but many plantations will not be back to normal outturn until 1960.

Encouraging results have been received with the use of C.M.U. (chlorophenyl dimethylurea) in the control of tasselling at Wailuku Sugar Co. on the Island of Maui. C.M.U. was applied at the rate of five pounds in five gallons of water. This was sprayed by airplane over 54 acres in the fall.

The tassel count on this acreage was only two per cent when made over the year end, compared with 29 per cent where there was no control.

Irrigation was also withheld on 51 acres to test the effectiveness of this method of tassel control. The tassel count dropped to 17%, compared with 29% where there was no control.

No final evaluation of results can be made until the fields are harvested in 1960.

Pioneer Mill Company on the Island of Maui has a new mill fly-ash arrestor which effectively stops the air pollution problem in the vicinity of the factory. More than 11½ tons of fly-ash are trapped each day.

The arresting mechanism, which has no moving parts, was developed by mill engineering personnel with the assistance of R. G. Watt, consulting technologist of American Factors, Ltd.

Olaa Sugar Company, on the Island of Hawaii, has put in a new hydroseparator to separate the mud from water which comes from the cane cleaning plant. In Hawaii, where all cane is mechanically harvested, every mill has a cleaning plant. Water is the principal cleaning element. Disposal of the water from the plant is a serious problem. The hydroseparator is being used by a number of plantations. Mud is pumped out to build new land, or to top poor soil areas. The water can be recirculated in the plant, or in some plantations it is used for irrigation.

Hawaiian Commercial & Sugar Company, on the Island of Maui, is studying a modified John Deere ditching plow, mounted on a Caterpillar D-4 tractor, as a line reshaper for ratoon crops. The line reshaper realigns rows in irrigated areas. It is largely a Hawaiian development and the units are fabricated on the plantations. The less costly ditching plows may be purchased from stock.

The Experiment Station, Hawaiian Sugar Planters' Association, is doing research on a teflon plastic coating for plow surfaces, to reduce drag. This was one of the new items reported at the year-end annual meeting of HSPA.

Freeze Does Not Affect Louisiana Crop

New Orleans, January 5:—Winter has arrived in the Louisiana sugar district and as this report is written freezing temperatures are being experienced all over the sugar belt. Fortunately the 1958-59 Louisiana grinding campaign is completed and, as far as we have been able to ascertain, not a stalk of sugar cane was lost because of the weather. The last mill finished grinding early Christmas morning.

The 1958 harvest season in Louisiana has gone into the record books as one of the best that this part of the world has experienced in many years. Despite the fact that the start of grinding was delayed at least a week to permit the completion of fall planting operations, the weather was so favorable that two mills completed grinding operations on December 3rd and most mills were finished by the third week in that month. Although the final production figures are not yet available it is estimated that Louisiana produced approximately 440,000 tons of sugar, raw value, which is 11% more than the 397,000 tons made from the 1957 crop.

We believe that the following interview with Gilbert J. Durbin, General Manager of the American Sugar Cane League, gives a clear picture of the 1958 Louisiana grinding season.

"Recoveries of sugar per ton of cane this year may establish a new record. The highest recovery in past years was in 1956 when an average of 179 pounds of sugar was obtained per net ton of cane. The amount of sugar produced from a ton of cane varies substantially from year to year. About 160 pounds is considered standard or normal.

"In the latter part of this year's cane grinding season, quite a few factories made more than 200 pounds of sugar per ton of cane. One mill produced as much as 226 pounds on some days.

"The several freezes in the Louisiana sugar area this fall did no damage to the cane crop. The lowest temperatures came when the end of grinding was not far away. By the time of the first bud-killing freeze, the sugar content of the cane had already built up to a high point. A hard freeze early in the harvest season would have caught the cane when the sugar content was relatively low and prevented a further increase in sugar. Also, cane with a small amount of sugar deteriorates faster after a hard freeze than does high-sugar cane.

"We continue to get reports of low cane yields from growers who did not use Endrin to control cane borers and reports of high cane yields from growers who used Endrin. Cane farmers who used Endrin are more than satisfied with this borer control chemical—they are enthusisatic about it."

Although the Louisiana grinding season is completed, the 1958-59 pricing period will not be over until February 26th when twenty weekly quotations on raw sugar and blackstrap molasses would have been issued by the Louisiana Sugar Exchange.

Prices since the start of the pricing period on October 16, 1958 have been considerably above those of last year on raw sugar and about the same for blackstrap molasses. The Exchange advises us that through the week ending January 1, 1959 the average price of raw sugar was $6.371 per hundred pounds, delivered New Orleans, whereas through the same date last season the average price of raw sugars, delivered New Orleans, was $6.132 per hundred pounds.

The average price of blackstrap molasses, f.o.b. plantation, through January 1, 1959, was 12.560 cents per gallon compared with an average through January 2, 1958 of 12.482 cents per gallon.

The higher price for raw sugar is attributable to the unrest in Cuba and now that this seems to have been settled the price of raws is expected to decline. The price of blackstrap molasses will probably advance somewhat because of the extremely cold weather throughout most of the country. The average price of raw sugar for the 1957-58 pricing period was $6.1287 per hundred pounds, delivered New Orleans and it is almost a certainty that the 1958-59 price will be above this figure. It is also probable that the season's average price for blackstrap molasses this year will be slightly more than the 12.6885 cent per gallon official price issued by the Exchange for the 1957-58 pricing period.

Messrs. Bronier Thibaut, President of the American Sugar Cane League, Gilbert J. Durbin, General Manager, Lloyd L. Lauden, Agronomist, and Malcolm Duhe, Chairman of the Contact Committee of the League, visited the Canal Point, Florida, U.S.D.A. Experiment Station during the week of January 11th on their annual inspection tour of the Florida station. Practically all of the new cane varieties for Louisiana are bred at the Canal Point station and Mr. Preston H. Dunckelman, who moved from Louisiana to the Florida station in August 1957, has high hopes for a successful season again this year. It will be recalled that during the 1957 cane breeding season Mr. Dunckelman produced over a half million seed from the crosses made at Canal Point. The 1958 cane breeding season is not yet completed.

The Louisiana sugar industry lost two of its distinguished citizens during the month since our last report and it is with regret that we record the deaths of Mr. M. L. Marquette and Mr. Louis Caillouet.

Mr. Marquette, Division Manager of the Oaklawn Division of the South Coast Corpn., Franklin, La. died on December 2nd after a long illness. Mr. Caillouet was stricken with a heart attack on December 29th and died shortly thereafter. He was the Secretary-Treasurer of the Caldwell Sugar Co-operative, Inc. of Thibodaux, La. Mr. Marquette was 53 years of age. Mr. Caillouet was 48. Both men were outstanding civic leaders of their communities.

Increase Canadian Production

Montreal, Jan. 7:—Production of refined beet and cane sugar in Canada in November rose to 239,780,000 pounds from 221,567,000 a year earlier, placing January-November output 6.6% above a year earlier at 1,516,594,000 pounds versus 1,422,945,000. Month's sales increased to 132,899,000 pounds from 117,432,000 and 11-month sales to 1,510,944,000 pounds from 1,391,898,000. Com-

pany-held stocks at November 30 were smaller than a year earlier at 340,253,000 pounds against 345,633,000.

Receipts of raw cane sugar in November advanced to 206,979,000 pounds from the corresponding 1957 total of 118,338,000, making the 11-month total eight per cent greater than a year earlier at 1,326,427,000 pounds versus 1,225,176,000. Meltings and sales in the month rose to 120,615,000 pounds from 118,598,000 and in the 11 months to 1,291,538,000 pounds from 1,240,408,000. End-of-November company-held stocks were larger at 266,642,000 pounds against 203,541,000.

■

Benson To Address California Growers

A major farm policy address will be the outstanding feature of the California Beet Growers Association annual meeting in San Francisco, California on January 30th. An exceptionally large attendance is expected, not only because of the importance of the speech by Secretary of Agriculture Ezra Taft Benson, but also because of the importance of the beet industry in California. First commercially successful beet sugar factory was built just 80 years ago at Alvarado, California and that state is today the leading producer of beet sugar. According to a statement by Gordon Lyons, executive manager of the California Beet Growers Association, over 600 members of the beet industry from California and other beet growing states will attend. Lawrence Myers, head of the U.S. Department of Agriculture Sugar Division, will also speak at the meeting. Technical sessions will start on January 26th at the Sheraton-Palace Hotel in San Francisco and extensive discussion of the renewal of the federal sugar act is anticipated. Secretary Benson's talk is expected to cover not only beet sugar but the general farm situation and will be a major policy statement.

■

Sugar Industry Technicians To Meet At National Republican Club

The 18th Annual Meeting of the Sugar Industry Technicians will be held at the National Republican Club in New York City, 54 West 40th Street, on May 11 and 12 of this year. On Sunday afternoon, May 10th, the directors of the organization will meet at the Club. In addition to the technical sessions scheduled for the following Monday and Tuesday, luncheon will be held both days and a reception and banquet will take place on Monday night, all in the National Republican Club. Much larger facilities for all sessions have been arranged in anticipation of a greatly increased attendance compared with the meeting last year which was held at the same location.

WHIRLEX
Shop Assembled
DUST COLLECTORS . . .

WHIRLEX INDUCED DRAFT FANS
with self supporting stacks are available for all types of boiler applications—including bagasse firing. Special shaft cooling sleeves allow for efficient use of air cooled bearings. Water cooled bearings can be furnished if desired.

- - - Eliminate Costly Field Assembly

Whirlex dust collectors are designed to provide maximum collection efficiency for each specific type of application. The unit is then fabricated and completely shop assembled and needs only to be set in place and the hoppers bolted on at the installation site. Each Whirlex unit is rigidly inspected before it leaves the shop, assuring a completely "gas-tight" installation. Sugar contamination is greatly minimized and machinery maintenance cost drops sharply with the use of Whirlex dust collectors.

More specific information is available upon request.

Fly Ash Arrestor
CORPORATION
202 North First Street • Birmingham, Alabama

Dust Collectors • Induced Draft Fans
Forced Draft Fans • Exhaust Fans
Self Supporting Stacks • Duct Work

FLY ASH WHIRLEX ARRESTOR

New Attachments, New Models

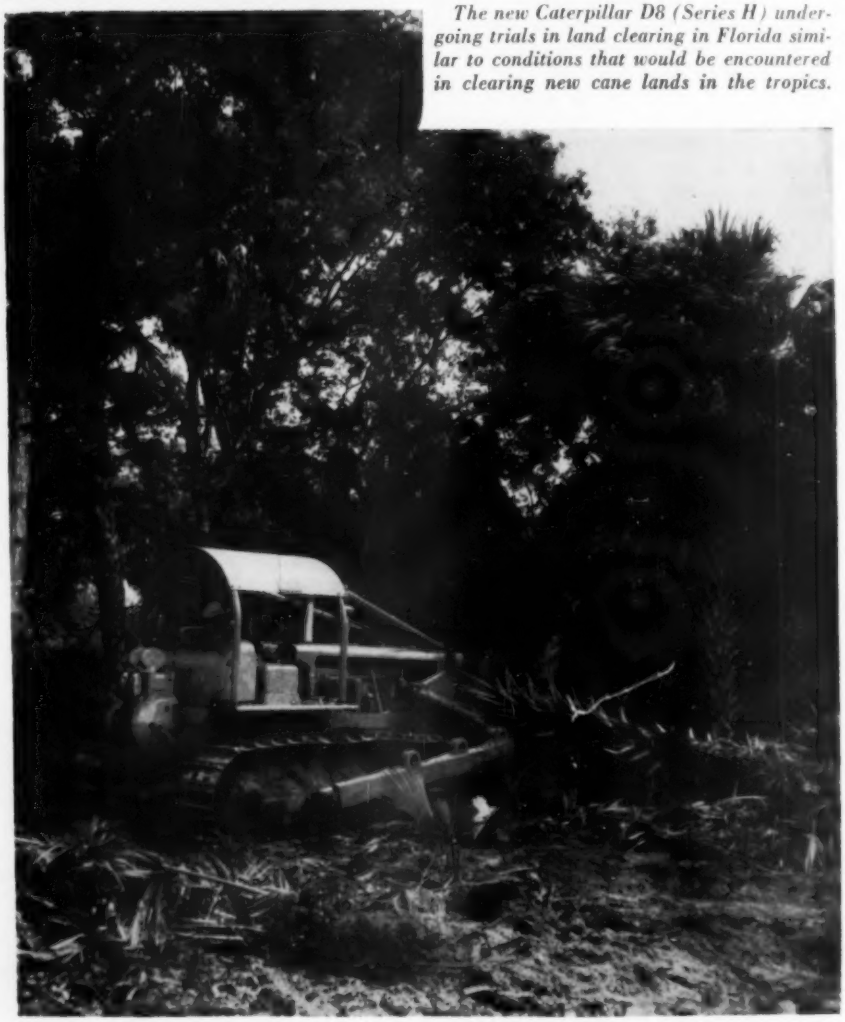
Tractor Developments For The Sugar Industry

Simplified cane loader developed by J & L Engineering Company for mounting on Caterpillar D4 model loading cane in Louisiana fields.

INNOVATIONS in the line of Caterpillar tractors and attachments of particular interest to the sugar industry have recently been announced from the home office of that company and from Jeanerette, Louisiana. A combination loader-ditcher attachment manufactured by the J & L Engineering Company and adapted to use on the D4 Caterpillar developing 50 drawbar horsepower has recently been announced. The loader has completely cushioned hydraulics, simplified controls, additional safety features and considerably greater operator visibility intended for more efficient cane loading operations. The heavy duty tubular boom may also be used in ditching for the construction and maintenance of irrigation facilities in the cane fields. The tubular design permits ready conversion of the cane loader to a fully hydraulic side boom ditching attachment and easy removal when the tractor is to be returned to regular cane field service. The grab loader, with a capacity of 1500 lbs. has replaceable heat treated alloy steel grab fingers with dirt catching braces completely eliminated. Piling devices manufactured by J & L are available for the model D4 Cat. One is the vertical chain piler which lifts and rolls the cane as the tractor moves forward and the other is the non-mechanical push piler that elevates the cane into a pile.

Caterpillar also announces a new D8 (Series H) tractor for heavy work. On this new model, suitable for ground clearing under the most rugged conditions and for deep plowing in heavy soils, horsepower, weight and ground clearance have been increased. It is available with torque converter or direct drive. Drawbar horsepower is 180. The new model is equipped with a turbo charger and dry type air filter which supplies cleaner air in the heavy going encountered in cane field work and requires much less service. Six speeds forward and six speeds in reverse speed up the operation of this new model. The tractor is equipped with a common lubricating systems using only engine oil from a single common source. Track rollers and idlers have sealed in lifetime lubrication. Design modifications improve operator visibility and comfort. Comparative tests carried out at the Peoria proving grounds showed a 20% increase in work output accomplished by the new Caterpillar D8 (Series H) tractor compared with the older D8 model which it replaces.

The new Caterpillar D8 (Series H) undergoing trials in land clearing in Florida similar to conditions that would be encountered in clearing new cane lands in the tropics.



Liquid Sugar Featured At Zerban Luncheon

The monthly meeting of the Zerban Sugarmens' Association on January 14th. in New York City heard a talk by Stephen J. Gullo on the subject of liquid sugar handling in the bottling plant. Mr. Gullo is a vice president of Pepsi-Cola Company. He

Stephen J. Gullo

produced charts showing the remarkable increase in the rate of conversion from bagged sugar to liquid sugar not only in the case of Pepsi bottlers, but by all industrial users as well. Liquid sugar, said Mr. Gullo offers advantages in processing and handling in a bottling plant such as bulk sugar delivery, ease of storage and transfer in the plant, simplified inventory and marked labor savings. A good liquid sugar installation requires a correct installation design, good equipment and adequate maintenance. Mr. Gullo gave specifications and descriptions of the functions of each component that makes up an installation and summed up by displaying a chart of a two-tank installation and briefly outlining recommended maintenance and sterilization practices. The next meeting of the Zerban Group will be held at Chemists Club in New York on February 11.

■

New Edition Sugar y Azucar Yearbook

The 1959 Edition of the SUGAR Y AZUCAR YEARBOOK is available for distribution. This is the 26th volume of this important reference work on the sugar industry. It contains condensed versions of all the important publications on sugar technology that have been printed throughout the world during the past year regardless of the language in which the original article was printed. This 30 page section, printed both in Spanish and in English, reviews well over 100 of the most important articles on sugar that have been published in the world. Extensive tables show production, consumption, per capita consumption, imports and exports for 90 countries around the world. A 62 page directory of suppliers of equipment and services to the sugar industry directs the reader to makers of "Accumulators" to "Worm Drives" and comprises the most complete and useful directory of its kind available to sugar men. The United States Sugar Act is reproduced in full and every administrative act taken under the law is described in an 11 page article by Robert H. Shields and Phillip E. Jones. All this material appears both in English and in Spanish. The 290 page book is available at $5.00 per copy and may be ordered through the Book Department, Palmer Publications, 604 Fifth Ave., New York 20, N.Y.

International Sugar Agreement Effective January 1st

The new International Sugar Agreement, negotiated in Geneva during September and October, enters into force on January 1, 1959. The Agreement provides that it shall enter into force if countries representing at least 70% of the votes of exporting countries and 60% of the votes of importing countries have either ratified the Agreement or given notification of their intention to ratify, accept or accede to it. First session of the International Sugar Council under the new Agreement opens at London on January 28, 1959.

Don't Risk Evaporator Slow Down!

THE WRIKORGS

Assure Top Production at the Lowest Cost!

*Here's Proof:**

1 "Compared with last year, when we did not use any Wrikorgs, we ground 282,000 more arrobas before our first clean-out, even though all of the cane ground last year was from the field and 80 percent of this year's cane was "burned".

2 "We have used Wrikorg since 1948. Runs without Wrikorg used to be approximately 14 days, during the present crop we have run up to 28 days."

3 "I have found our apparatus functioning in perfect order and without any interruption during a period of 21 days with increased maceration in the grinding process and constant pumping of the sirup between 28 and 30 degrees Beaume. Cleaning was quick and easy, and the quadruple was completely clean. Another consequence is great savings in acid and potash, and decrease of equipment wear by about 40 percent."

*Company names and details upon request.

Just as they have done for those above, and many others, Wright Engineers will make an analysis of your water and juice problems and recommend the proper solution for you... without cost or obligation. Wire or write today for immediate service *this* season.

Wright CHEMICALS

WRIGHT CHEMICAL CORPORATION
GENERAL OFFICES AND LABORATORY
627 WEST LAKE STREET, CHICAGO 6, ILLINOIS
Offices in Principal Cities
(Havana, Cuba: Domenech & Co., S. A., 405 Obrapia)

- Softeners, Filters and other external Treating Equipment
- Nelson Chemical Proportioning Pumps

SUGAR ABSTRACTS

Published under the Auspices of the International Society of Sugar Cane Technologists

by Special Arrangement with

SUGAR y AZÚCAR — Dr. O. W. Willcox, Editor

Agriculture

Control of Eelworms or Nematodes

ANON. *South Africa Sugar Journal*, Vol. 41, No. 8, p. 655 (1958).

As a result of the discovery that infestation of the roots of sugar cane is the cause of serious losses of yield, investigation of this problem has become an important matter by the entomologic department of the South African Sugar Experiment Station. Heretofore the only satisfactory treatment available is soil fumigation (with methyl bromide, which is very expensive).

Attention is now called to the work of a Scotch investigator (Dr. John Grainger of the Auchincruive Experiment Station, Scotland) on potato nematodes, who has found a less expensive nematocide and an appropriate method of using it. The nematocide used against this pest is powdered metallic mercury in a very finely divided form, for which a special machine is required, as the distribution of the metal in the soil has to be very thorough. Only 5.5 lbs./acre of mercury is required but mixing is relatively easy through use of radioactive iodine[131]. The method of application is as follows:

A suitable amount of mercury (5.5 lbs./acre) is thoroughly mixed with soil for application to the field in two operations—half on the surface and the other half at depth of seven inches. These two applications can then be adequately mixed with the soil in the field by means of a Rotovator working to a depth of nine inches.

■

Technology

Superior White Cane Sugar by the Carbonation Process

YING-CHEN CHIN, *Tawaiian Sugar*, Vol. V, No. 7, pp. 13-17 (1958).

At the Cheluchien cane sugar factory in Formosa granulated white sugar of quality equal to standard refined sugar (Pol 99.6-99.9, moisture below 0.05, sulfated ash 0.041, reducing sugar below 0.05, color and sediment as per standard) is being made by a new design for the ordinary De Haan carbonation process.

In this revamped carbonation process, the mixed juice is continuously prelimed at 55°C. to pH 10.5 and goes to the first carbonation tank where it is carbonated for 7-8 instead of the usual 4-5 minutes, and filtered. The filtered first-carbonation juice goes to the second-carbonation tank which is provided with a high-speed circulation pump to ensure thorough mixing. This second carbonation is continuous; retention time, 7.6 minutes; absorption of CO_2 95%; CaO precipitated, 251 mg/liter.

Heretofore the boiling scheme used in this factory for manufacturing plantation white sugar was to use double-purged third sugar as seed for the second sugar and single-purged second sugar as seed for the first sugar. The final product of this sugar generally had a relatively large amount of ash. This system has been replaced as follows: the double-purged third sugar is all remelted and goes back to raw syrup for sulfitation and refiltration; the second-sugar (to be used as seed for the first sugar) is purged twice in the following manner: when the crystals (grained by stock seeding) have grown to half the size expected in the second sugar, the partially crystallized massecuite is struck and purged once; this once-purged sugar (called "small seed") is mixed with first molasses to form a magma and then built up to proper grain-size of second sugar by feeding with more of the first molasses; this repurged second-sugar ("large seed") is used as feed for first sugar to which double purging is applied as usual. This procedure reduces the ash content to the limit required of "superior white crystal."

A critical stage in this process is filtration of the sulfited mixture of double-purged third sugar and the raw syrup prior to its entry into the vacuum pan. Excellent clarity is obtained by Sparkler RSC 560 filters using a total of 50 lbs. of Hyflo-Supercel (as precoating and body-feed) per filter cycle of 7—10 hours, Bx. 55, syrup temperature of 65°C. and a flow rate of 5.45 GPH.

Special precautions are needed to keep color and the sedimentation test within limits. Exhaust steam should be used instead of live steam for washing out the pans and this steam should be passed through an oil separator; this avoids possible caramelization. To get rid of rust particles the washings are preferably collected in a small tank and returned to mixed juice. All gutters and conveyors and other surfaces in contact with the filtered syrup and crystal sugar should be made of stainless steel, copper or at least galvanized metal; and, in general, cleanliness should prevail.

■

The Danish Method of Scalding Sugar Beets

T. WINTZELL, *Communications* from the Swedish Sugar Corporation, Vol. 14, No. 2, pp. 15-25 (1958).

It is generally understood that when beet cossettes are heated at a temperature sufficiently high to kill the sugar-bearing cells, the sugar easily moves out into the circulating water. This idea has been incorporated in the design of continuous horizontal and tower diffusers. For instance, the first RT diffuser installed in Sweden provided for scalding the incoming cossettes with eight to 10 times their volume of hot juice (76° to 77° C.) drawn from the diffusion cylinder before the new cossettes enter the regular diffusion process. This scalding process is also a feature of a

new Buckau plant installed in 1957 at the Morbylang sugar factory. Here the volume of circulated scalding juice is three times that of the draft juice. Diffusion temperature is here 76° C. and retention time of the cossettes in the scalding trough is nine minutes.

The scalding technique adopted for the design of the diffusion-trough recently introduced by the Danish Sugar Corporation presents novel features.

The Danish diffuser is a simple inclined trough, and no provision is made for pre-scalding the cossettes, which are simply pushed through the diffuser at one end in counter current flow to the raw juice which is heated to 70° and is coming in through the other end. When the hot juice meets the cold cossettes, its temperature is reduced to 18° or 25° C., depending on the outside temperature. However, within 2½ minutes, and after advancing about six feet into the diffuser, the temperature of the cossettes has risen to the same temperature as the incoming juice (70° C.) and maintains this temperature to the end.

The surprising fact here is that the cells can be effectively killed at 70° C. and that this temperature is sufficient to coagulate the protein constituents of the juice. These proteins are retained so tenaciously in the pulp that no precipitate is obtained when the pulp water has been acidified with sulphuric acid; the diffusion juice then contains less nitrogenous impurities.

■

Viscosity of Crystal Suspensions

F. H. C. KELLEY, *Sharkara*, Vol. 1, No. 1, pp. 37-45 (1958).

The exhaustability of a massecuite depends not only on the specific viscosity of the mother liquor, but also on the shape and size of the crystals suspended in the molasses. That is to say, the exhaustability of a massecuite is a combined function of the viscosity of the mother liquor and the viscosity of the massecuite as a whole. The more regular the shape and size of the crystals, the less is the viscosity of the massecuite as a whole and the more complete is the exhaustion of the molasses.

When the average crystal grows from 0.35 mm. to 0.85 mm. at 42% crystal content a specific viscosity increase of approximately 2.4 fold may be expected. On the other hand a seeded pan commencing with molasses and finishing at a crystal content of 42% and an average size of 0.35 mm. could experience an eleven-fold increase in viscosity due to crystal growth alone. A further increase would be experienced with fall in mother liquor purity. Probably the most unfavorable conditions are experienced with formation of conglomerates. (For these reasons it is highly important to control the crystallization qualities of sugar-end liquors. See following abstract. Ed.)

■

Measurement and Evaluation of Crystallization Velocity

HUGH C. ROUNDS AND PAUL C. KUNKEL, *Jour. American Society Sugar Beet Technologists*, Vol. 10, No. 1, pp. 42-47 (1958).

The need for knowledge of the crystallizing qualities of sugar-end liquors has long been recognized. Information relative to the crystallizing characteristics of liquors in process would greatly assist operators in maintaining maximum extraction.

Fundamentally the rate of growth of crystals in the mother liquor can be determined either by measurements of changes in crystal size or weight, or indirectly by the measurement of changes as crystallization. A method for control purposes, however, imposes the following limitations: The method must be rapid enough to allow the use of the result while the liquor is still available and must be simple enough to be performed by the ordinary laboratory technician.

The method as now developed is as follows:

1. From single or double acid true purity determinations of liquors that are to be compared, calculated amounts of pure sucrose and water are added to the liquors to adjust purity and solids concentration to standardized values. Final adjustment of solids content can be made by water addition or by evaporation. The concentration should place the sample at a supersaturated level of between 1.1 and 1.2 when calculated as follows:

$$S = \frac{\text{Ratio of Sucrose to Water}}{\text{Ratio of Sucrose to Water in saturated solution at the same temperature and purity}}$$

Where S is the degree of supersaturation

2. Each sample is cooled to 20° C. and two to four 30 gram aliquots from each sample are weighed into test tubes. Each aliquot is seeded with stock fondant sugar, amounts ranging from 0.25% to 0.30% of total sucrose present with exactly the same quantity being used for each aliquot of each sample being prepared.

3. The seed is thoroughly mixed into the syrup, which establishes zero time. The aliquots are kept sealed at 20°C. until the final time is reached, which may be taken from 30 to 120 minutes, depending on purity, supersaturation, and the amount of seed used. No crystals have been observed to settle out for crystallization periods up to two hours: therefore, it is not necessary to agitate the slurry after the initial mixing of seed and syrup.

At the end of the designated time a thick smear of the seeded syrup is placed between the prisms of the refractometer and the reading made directly.

4. The calculations are made from the following formula:

$$\text{Crystallization Rate} = \frac{C_o - C}{T} \times 1000$$

Where: C_o = Original concentration, grams total solids per 100 grams water; C = Final concentration, grams total solids per 100 grams of water, and T = Total time in minutes.

The time required is variable, depending on the nature of the liquor. To obtain significant changes in one hour or less the purity of the samples should not be less than 85, otherwise the time may be two or more hours.

■

Safety Aspects of Boiler and Turbine Operation

D. S. SHANN, *Proceedings*, Queensland Society Sugar Cane Technologists, Vol. 25, pp. 109-114 (1958).

Sufficient experience with steam turbines for the generation of electric power and for driving cane mills has now disclosed a general pattern of the operational behavior of these turbines. So far as the turbines used for driving the mills are concerned, the Queensland sugar industry has been faced with a rapidly growing case history of extremely swift and serious wastage of turbine components, apparently due to the combined effects of corrosion and erosion. At least eight Queensland mills have experienced this trouble; at one mill (in 1957), one stage of the turbine failed completely.

There are two main factors that can affect the rate of wastage of the internal parts of the turbine, these are: Contamination of steam by corrosive substances, and the presence of excess moisture in the steam. If the steam remains superheated there will be no corrosion, since the corrosive substances will pass out in the form of a dry powder or a gas, without exerting an abrasive or corrosive action, and it is a fact that in those factories where superheated steam is supplied to the turbines, little or no trouble has resulted from corrosion or erosion effects.

It must be remembered that both steam quality and purity are largely dependent on the condition of the boiler feed water. It is absolutely essential that the pH of the water in every steam boiler in the factory be maintained at a safe level (8.5–10.5). Especially during periods of high rates of evaporation, the boilers wherein the pH is at a low level should be given immediate individual attention.

■

Performance of Recent C & H Calandria Pans

E. C. GILLETT, D. B. LOTT AND R. S. PATTERSON. *Proceedings Sugar Industry Technicians*, May, 1958, Section I.

The Crockett refinery has a total of 14 pans, including both coil and calandria pans. Long experience in comparing the operations of these units has shown that while the available coil pans were better for white sugar boiling than calandria pans because of better crystal quality and higher yields, the calandria pans require less maintenance and occupy less space; and, as shown in this report, they may be designed for boiling rates up to twice as fast as in coil pans.

Two new designs are described. One is a new calandria remelt pan to replace an old coil pan. The new pan has the following specifications: pan diam. 12′, center well diam. 5.33′, tube diams. 4″, tube lengths 2′-6″, heating surface 1295 sq. ft., normal masse volume 1100 cu. ft., masse volume at min. graining point ¾ cu. ft., ratio of heating surface to normal masse volume 1.18, ratio center well diam. to pan diam. 0.44, ratio min. graining charge to normal masse vol. 0.29, pan capacity on No. 3 remelt in tons solids per hour per 100 sq. ft. heating surface 0.87.

The instrumentation of this pan includes: (1) programmed absolute pressure controller for water supply to condenser in a pre-set cycle, (2) indicating and recording absolute pressure gage, (3) indicating vacuum gage, (4) pressure gage on the 10-lb. steam system, (5) flow meter on the 10-lb. steam system, (6) pressure gage and regulator on the 50 lb. steam system, (7) indicating and recording thermometer, (8) indicating and recording supersaturation meter, (9) automatic feed control device actuated by the motor driving the mechanical stirrer.

The provision of automatic feed control governed by the power load on the motor that drives the stirrer is of larger value during the critical 15 to 20 minutes after the seeding, which largely determines the ultimate grain quality. Control of the steam pressure allows the upper level of the masse to be extended to 7 ft., thus gaining capacity without loss of quality of the grain, and a large reduction of boiling time.

The same design features were in the main employed in the replacement of a white sugar calandria pan that had operated without a mechanical stirrer. Here, the improvement in quality and capacity are comparable with the results obtained from the new remelt pan.

■

Caramel for Standardizing Active Carbons

S. K. D. AGARWAL, *Sugar Technologists' Association India*, Part I, pp. 129-136 (1957).

Caramel has been used in methods for evaluating the efficacy of active carbons employed in the refining of sugar. In a commonly used method a known weight of the carbon is added to a solution of pure caramel that has been buffered to a certain pH and boiled under reflux. The solution is centrifuged and its color in relation to that of the original caramel solution gives a measure of the decolorizing activity of the carbon. However, it should be determined beforehand, that the caramel itself, without the presence of active carbon, will not change the intensity of its color during the boiling.

A method of preparing a caramel for this purpose is to mix a desired quantity of sugar solution of known strength with a standard alkali solution and warm at 100° C. until the solution acquires a dark brown color. The crude caramel is precipitated by addition of alcohol, filtered, washed with alcohol and ether to remove uncaramelized sugar and decomposition products, and dried.

The standardization process is carried out as follows: A known volume of a water solution of the pure caramel is mixed with a buffer solution of NaOH or other alkaline substance of a known pH in a round bottom flask; a little of the solution is withdrawn for a color determination and the rest boiled under reflux for 30 minutes. The small amount of water lost in the operation is made up, and the color is again determined by a spectrophotometer. The difference between the two colors measures the decolorizing efficacy of the carbon.

Two important points in these operations are: the original alkaline sugar solution should be boiled under reflux for more than six hours until there is no change in color on further refluxing for 30 minutes; a pH of 8.00 is suitable for the prepared solution used in the standardization test.

■

Books

Technology for Sugar Refinery Workers

OLIVER LYLE. 3rd edition, revised, rearranged and enlarged; published by Chapman & Hall, London, 663 pp., 70 s. (1957).

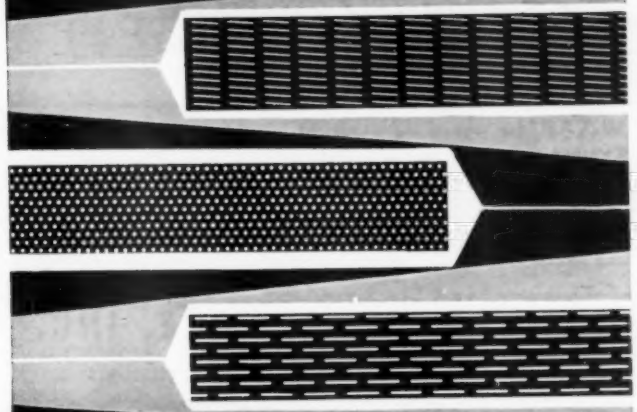
In its new third edition this valuable book has been expanded to 663 pages, divided into 24 chapters which are subdivided into 635 sections devoted to specific topics. The plan of the book is not to describe sugar refining in general terms that are more or less indefinite, but rather to explain the things that are continually being done in the refinery and why these things are done; why particular kinds of equipment are used in particular places; to explain heat and electricity in terms understandable to foremen and workers; to explain the tests that are used to measure the success of the process; and to explain the economy of the refinery. The idea is that if the worker knows what Brix, Pol, and pH really mean he will look upon the laboratory as a place where help and guidance may be obtained. And if he understands the actual workings of pumps and motors, he can be depended on to get the best out of them.

The author states that most of the additions and alterations incorporated in the new edition originated in suggestions from some 150 members of the Tate & Lyle staff. The result is that what we have before us is a book wherein many minds have met and have produced a conspectus of sugar refining not be found in any other book on the subject.

Although the book has been written primarily for employees of one British sugar refining company, its scope is far less parochial than might be imagined because this company handles raw beet and cane sugars from many parts of the world. Raw sugars from these various sources have widely varying characteristics that require application of well-tested refining methods and well-defined systems of process control. No matter how many other books he may possess, no earnest student of sugar refining can afford to do without this one, even though it sticks to bone char as the only practical means of decolorizing sugar liquors and does not contemplate use of activated vegetable carbons.

There is an elaborate index; it runs to 29 double column-pages in fine type.

FONTAINE ORIGINAL



Serving the Sugar Industry for more than 100 Years

Perforated Sheets of all Types;
Speciality: Small Perforations

FONTAINE & CO. GMBH. · AACHEN W.-GERMANY

PRECISION BS INSTRUMENTS

Pocket Refractometers

for the examination of

JAM
FRUIT JUICE
CONCENTRATED ORANGE JUICE
SUGAR SOLUTIONS
BEVERAGES
STARCH PRODUCTS
MILK
FRUIT
HONEY
Etc.

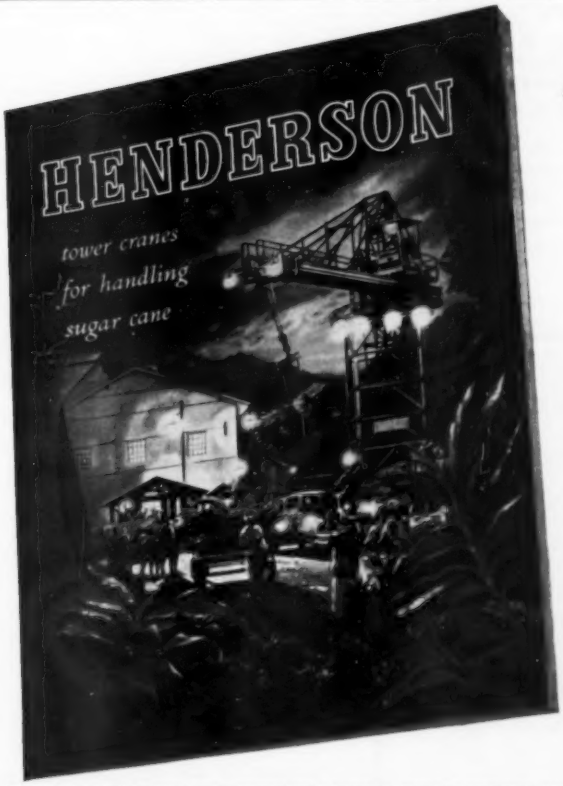
Instruments Reading 0-50, 15-55 and 40-85% soluble solids, each	£12.	0.	0.
Ditto 0-28% soluble solids	£15.	0.	0.
Ditto 78-98% honey or 0-27% starch, each	£15.	0.	0.

Ex Works. Postage and packing extra.

These instruments can be supplied direct from the makers:

Bellingham & Stanley Ltd.

DEPT. S, 71 HORNSEY RISE, LONDON, N. 19, ENGLAND
or from
selling agents in all countries

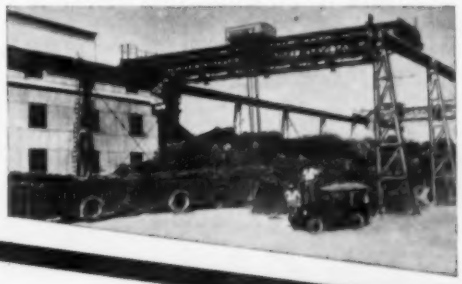


RELIABILITY — THE IMPORTANT FACTOR

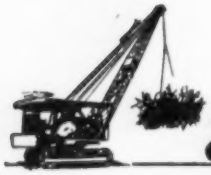
When, at the height of the season, equipment must work 24-hours a day, reliability and speed of handling are of the utmost importance. Henderson Tower Cranes are built to withstand such conditions. Full details are contained in an attractive brochure. Please write for your copy and learn how Henderson Tower Cranes will help you to achieve greater and speedier production.

Henderson

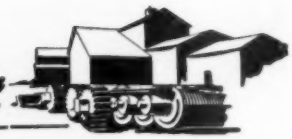
FIXED TOWER AND OVERHEAD CRANES



JOHN M HENDERSON AND COMPANY LIMITED KING'S WORKS ABERDEEN SCOTLAND *Tel: CENtral 24262 (3 lines) Grams: CRANES ABERDEEN*
P.1144



Equipment & Service Market



POSITION WANTED

Young Dutch Sugar Chemist and Technologist — College trained — Graduate School of Sugar Industry, Amsterdam. Experience in Holland, France and U. S. refineries also with research in sugar decolorization with synthetic resins. Speaks English, German and French — married — permanent visa for U.S. — seeks position in cane sugar factory or refinery in this country or U.S. territories.

Write Box #776, Sugar y Azucar, New York 20, N. Y.

WANTED

General Supervising Engineer for Group of Centrals grinding 7500 tons daily available shortly for engagement. Over 30 years world wide experience. Apply Box # 777 — Sugar y Azucar — 604 Fifth Avenue, New York 20, N. Y.

POSITION WANTED

Chemical Engineer, U. S. citizen, with experience in raw and refined sugar production and laboratory techniques desires position in technical sales and services abroad. Young, veteran, married, speaks fluent Spanish. Write Box #779, Sugar y Azucar, 604 5th Ave., New York, N. Y.

WANTED

Experienced Assistant Superintendent for Midwestern Beet Sugar Factory. State Age, background and salary desired. Box #780, Sugar y Azucar, 604 Fifth Ave., New York 20, N. Y.

WANTED

Mechanical or Chemical Engineer preferably with experience in sugar industry. State age, background and salary desired. Write Box #781, Sugar y Azucar, 604 Fifth Avenue, New York 20, New York.

POSITION WANTED

British South-American born Electro-Mechanical Engineer with 8 yrs. experience as Chief Engineer in South America sugar factories, seeks similar position in North or Central America; would consider position in Manufacturing Firms of Sugar Machinery or Consulting Engineering Firms — Fluent Spanish and English — Age 31 — Box #782, Sugar y Azucar, 604 5th Avenue, N. Y. 20, N. Y.

POSITION WANTED

Young energetic Chemist and Sugar Technologist, married, 4 yrs. experience in beet and cane factories, in raw and white sugar processing, sulphitation, carbonation and refineries. Practical experience in panboiling. Fully competent and experienced in directing every phase of plant operation. Speak German, French, Dutch, English and Spanish. Desires position as Chief Chemist. Box #783, Sugar y Azucar, 604 5th Avenue, N. Y. 20, N. Y.

FOR SALE

Vallez Filter—Type C-49-I, 738 sq. feet with 41 Stainless covered leaves. Used only 6 months. Also Hersey Dryers, Vacuum Pans, Evaporators, Centrifugals, Rotary Dryers, etc. SEND FOR LISTING.

STEIN EQUIPMENT COMPANY

107—8th Street Brooklyn 15, New York

RICHARD W. ARMS

Cane Sugar Consultant
Appraisals — Surveys — Reports
Specializing in Agricultural Problems
38 yrs. experience in sugar industry

27 Ash St.
Hopkinton, Mass. Tel. Idlewood 5-3629

LIQUIDATING SURPLUS SWEETLAND #12 FILTERS WITH 72 STAINLESS STEEL LEAVES FROM A MOLASSES COMPANY.
DETAILS UPON REQUEST.

R. GELB & SONS, INC.

US22 UNION N. J. MUrdock 6-4900

DRYER, DIESEL LOCOMOTIVES, & ENGINE

7 GE Std. Ga. 25, 44, 65, 80 & 100 ton
2 Plymouth 36" ga. 18 & 20 ton
2—80 ton, 1—25 ton GE 42 in. ga.
SD8-25 Heil 8' x 25' Dryer
26 x 42 Hamilton Corliss Engine

R. C. STANHOPE, INC.
60 E. 42nd St., New York 17, N. Y.

E. C. MASSON

Member A.S.M.E.
Consulting Engineer

CANE SUGAR MILLS & REFINERIES

Engineering & Construction — Expansion & Improvements

FACTORY AUTOMATION.

MIAMI 10, FLORIDA, U.S.A.

P. O. Box 1728 Telephone:
Cables: NOSSAM Highland 3-3025

The New 1959 Edition of

Sugar y Azucar Yearbook

Volume 27

Contains data of importance to every sugar man in the world.

Order your copy now. $5.00

Palmer Publications Book Department
604 Fifth Ave., New York 20, N. Y.

ROY J. LEFFINGWELL

HUMAN RELATIONS CONSULTANT TO THE SUGAR INDUSTRY

11 Years Head of Public Relations
Hawaiian Sugar Planters' Assn.

P.O. Box 4034 Honolulu, Hawaii

E. A. ROSE, INC.

Consulting Engineers

COMPLETE
SUGAR
FACTORIES

LEE CIRCLE BUILDING
NEW ORLEANS, U.S.A.

FOR SALE

Complete Sugar Factories 300 to 1500 tons.
12—40" Motor Driven Centrifugals.
10—Vallez & Sweetland Filters up to 720 sq. ft.
7—Boilers from 400 to 1500 HP.
4—Turbo Generartors 200 KW to 3000 KW.
4—Link Belt Sugar Dryers 3'10" x 16' to 7'5" x 25'.
12—36"x36" Shriver and Sperry Cast Iron Filter Presses.
5—Corliss Engines 18" x 36" to 26" x 26" x 48".

SPECIALIZING IN SINGLE ITEMS TO COMPLETE PLANTS
PARTIAL LIST ONLY—YOUR INQUIRIES SOLICITED

BRILL EQUIPMENT COMPANY

2401 Third Ave., New York 51, N. Y.
Texas Office: 4101 San Jacinto St., Houston
Cable Address: Bristen Est. 1926

COMPRESORES — BOMBAS AL VACIO
1902 AMERICAN 1959
Lo Mejor en Reconstrucciones

137 CFM 100 PSI 7 x 7 Ingersoll ES1
140 CFM 3500 PSI 12¼ x 10 Norwalk TRS4T
234 CFM 100 PSI 9 x 9 Ing. ES1
354 CFM Vacuum 14 x 5 Ingersoll ER
437 CFM Vacuum 14 x 7 Worth & Chicago
465 CFM 100 PSI 12 x 11 Ingersoll ES1
502 CFM 125 PSI 12 x 13 Worth HB
585 CFM 100 PSI 15-9¼ x 12 Ing. XRE
676 CFM 100 PSI 15-9¼ x 12 Ing. XRB
870 CFM 125 PSI 17-10 x 12 Ing. XRB
686 CFM 100 PSI 14 x 13 Worth HB & Ing.
800 CFM Vacuum 18 x 9 Worth
823 CFM Vacuum 18 x 7 Worth. HBV
870 CFM 110 PSI 17-10 x 12 Ing. XRE 150 HP Syn 3-60-220
920 CFM 110 PSI 18-11 x 12 CP OCE
1500 CFM Vacuum 24 x 10 CP
1292 CFM Vacuum 22 x 9 Ing. ES
2018 CFM 26 x 11 Vacuum Ing. ES
3135 CFM Vacuum 31 x 13 Ing. ES—Worth HBV

Portátiles

30 CFM to 600 CFM—Gas—Diesel
Giratorias y Alternativas

American Air Compressor Corp.

48th & "S" Streets, North Bergen, New Jersey, E.U.A.

Sugar Lost in Transit and Storage

During past years sugar producers of Puerto Rico have been complaining about decreases in weight and polarization of raw sugar between the time it is produced on the Island and the time it arrives at mainland ports in the United States. According to some estimates these changes have resulted in an average cost to Puerto Rican sugar producers of slightly more than $36,000 per mill per year; when calculated on a whole-island basis the total loss for all mills has amounted to approximately $1 million dollars annually.

At the request of the Puerto Rican sugar producers the Agricultural and Marketing Service of the United States Department of Agriculture made a three-year study of the matter.* The investigation was spread over three years and turned up the information shown in the accompanying table, wherein the losses are figured in percents.

Years	*1953*	*1954*	*1955*
Weight loss	**0.59**	**0.73**	**0.83**
Pol. loss	**0.43**	**0.29**	**0.44**
Total loss	**1.02**	**1.02**	**1.32**

Total losses are greater in shipments of bagged sugar than in bulk shipments because of losses during storage, different methods of weighing, and spillage from bags.

Among mills there were considerable variations in losses of weight and polarization in bagged, raw sugar; weight losses per mill ranged from 0.26 to 0.99%, polarization losses from 0.10° to 0.88°. The mills with the largest weight losses tended to have smaller polarization losses, which indicates that some of the weight loss was caused by moisture losses and do not contribute to a loss in value.

The large variations from the above-cited averages are due to a multiplicity of local circumstances. Puerto Rican sugar shipped to northern United States mainland ports loses more weight and polarization than sugar shipped to the southern ports. In general, losses of weight in bagged sugar is due to loss of moisture, breakage of bags and methods of weighing at some ports. Losses of weight in bulk sugar are negligible. Losses of polarization may be attributed to change in moisture content, deterioration during storage and shipment, inaccurate sampling, or failure to adjust the polarizations obtained in the mill laboratories to allow for the temperature of 20° C. which is standard in the laboratories at mainland ports.

The method of weighing sugar is not the same at all the United States ports. The rising-beam scale used at some of the northern ports is calibrated at four-pound intervals, and the beam usually indicates a weight somewhere in this interval; the lower value of the interval, however, is always the weight recorded, and thus is always lower than the actual weight, with the result that the recorded weight is always two pounds less than the actual weight. With this two-pound loss on an eight-bag lot the shipper is paid one-tenth of one percent less than is due to him.

* Marketing Research Report No. 220.

■

Harvester Cuts, Cleans & Loads Cane

Development in Louisiana of a machine that not only cuts, but cleans and loads cane, may prove of considerable interest to cane growers in areas outside the United States. In 1949 a machine was developed by the Carry Iron Works of Opelousas, Louisiana and several years of development work was devoted to its perfection. In 1957 a group of Louisiana planters cooperated to put the newest Carry machine in the field during the 1958 harvest. During the two months of tests the machine performed satisfactorily and minor adjustments were made on the basis of field experience. Following the Louisiana trials, the machine will be transferred to Clewiston, Florida where it will be tested under conditions of much heavier stands of cane running to 80 tons per acre. The harvester is designed to pick up lodged or recumbent cane, cut the stalks into 21 inch lengths which are delivered to special cane carts traveling alongside the harvester. Complete performance data are not available at this writing, but reliable estimates indicate that it will handle between 175 and 275 tons of cane daily. Sucrose content appears higher than in the case of the simple cane cutter. At present, the machine will handle only cane planted on slight ridges of one inch elevation or more. Work is planned to develop a topping blade to decrease the green tops that now, to a limited degree, are mixed with the harvested cane. Ultimately, it is planned to adopt the harvester for use in irrigated fields where the cane grows between ridges.

■

Feeder Roll Added in Hawaii

Kekaha Sugar Company, located on the Island of Kauai, Hawaii, has made four-roll mills out of their old three-rollers through the addition of a feeder-pusher roll.

The 20 x 78 inch feeder-pusher rolls are set in each mill just above the large feed roll, and force the cane mat between the top and feed roll.

Surface rate of the feeder-pusher roll is 1.3 times that of the other three rolls, which formerly turned at 40 feet per minute. With installation of the feeder-pusher rolls the speed of the other rolls is cut to 35 feet per minute, without loss of speed in the movement of the blanket of cane through the mills, or loss in juice extraction.

During the 1957 grinding year the factory lost 86.33 hours of grinding time due to stoppages. Over 30 hours of this time was due to choking in the mills. For each hour of grinding time lost it is estimated that 12 tons of cane are lost. At the price of $123 per ton of sugar, this means about $1,476 per hour. Multiplied by 30 hours, this means a loss of some $44,280 in one year.

Since the feeder-pusher rolls have been in operation there has not been any time lost due to chokes.

Extraction of the factory averaged 94.98% in 1957. It is hoped that the feeder-pusher rolls will mean an increase of one per cent in extraction.

Combined harvester, cleaner and loader, manufactured by Carry Iron Works, being tested during the 1958 harvest at Lula Plantation near Donaldsonville, Louisiana.

ESTA ES LA NORMA BROADBENT . . .

EL SISTEMA PATENTADO DE CONSTRUCCION DE UNA SOLA PIEZA

El motor, rotor y canasto van directamente montados en un eje y soportados por un juego de cojinetes principales.

Se emplea un número mínimo de piezas construídas a precisión y diseñadas para "ejercer su función lo más directamente posible".

Este sistema básico de suspensión fue introducido por nosotros hace 30 años, y siempre ha dado buenos resultados.

CENTRIFUGAS BROADBENT *para Azúcar*

THOMAS BROADBENT & SONS LTD. • CENTRAL IRON WORKS • HUDDERSFIELD • INGLATERRA

El mayor fabricante del mundo dedicado a centrifugas industriales únicamente

Teléfono: 5520-5 *Telegramas: BROADBENT HUDDERSFIELD*

AZÚCAR

Febrero 1959

Nuevo Estudio Sobre Un Método Mejorado

Difusión de Remolacha a Baja Temperatura - III

Por E. F. Boon, H. I. Waterman y P. W. van der Poel
con la colaboración de
J. D. van Alphen y G. van Weert

El primer artículo de esta serie apareció en la página 29 de la edición de Mayo 1958 de *Sugar y Azúcar*. El artículo describía el método de matar las células vegetales con cloroformo a temperaturas menores de 40° C, y citaba experimentos para demostrar la ventaja de seguir este método. El segundo artículo apareció en la página 26 de la edición de Septiembre 1958, y describía los experimentos con el microscopio electrónico que indicaron que el tejido vegetativo de las paredes de las células de remolacha se descompone bajo las condiciones reinantes en la difusión en caliente pero no bajo las condiciones de la difusión en frío. El presente artículo trata de la purificación de jugos crudos de difusión en frío, comparada con la purificación de jugos generalmente en práctica. —Editor.

Los artículos anteriores demostraron que los jugos crudos obtenidos por el proceso de difusión en frío contienen muy poca cantidad de contaminación coloidal. La purificación de estos jugos crudos puede ser muy sencilla. Después de su tratamiento con 0.3% de cal conforme al método de Brieghel-Müller, se obtiene una suspensión que se puede filtrar muy fácilmente a 90° C. El filtrado sale libre de preteínas y substancias pécticas.

Se ha probado que con el empleo de permutadores iónicos se pueden remover todas las demás impurezas, como substancias colorantes, ceniza y aminoácidos. Los permutadores iónicos no pierden su capacidad al cabo de muchos ciclos de percolación y regeneración.

En nuestra planta semicomercial hicimos una comparación de las siguientes filtraciones:

1. Filtración de jugos crudos prealcalizados obtenida por difusión en caliente.
2. Filtración de jugos crudos prealcalizados obtenida por difusión en frío.
   a. Sin ácido sulfúreo.
   b. Jugos crudos obtenidos de cosetas a las que se había agregado 0.05% de dióxido de azufre (calculado sobre el peso de remolacha) antes del tratamiento con cloroformo.
3. Filtración de jugos prealcalizados, alcalizados y carbonatados de difusión en caliente.

La prealcalización de jugos crudos de difusión en frío conforme al método de Brieghel-Müller con 0.3% de cal calculado sobre el peso del jugo crudo agregado. La prealcalización se llevó a cabo a 60 o a 90° C.

La prealcalización de jugos crudos de difusión también se llevó a cabo conforme al método de Brieghel-Müller con 0.2% de cal. La temperatura durante la prealcalización se mantuvo a 60 o a 90° C. La temperatura durante la prealcalización no afecta la velocidad de filtración de las suspensiones. Si la prealcalización se lleva a cabo a 90° C, el azúcar invertido en los jugos se destruye casi por completo. Si la prealcalización se lleva a cabo a 60° C o menos, el 70% del azúcar invertido en los jugos crudos permanece inalterado.

Aunque las velocidades de filtración en nuestros ensayos fueron adecuadas, conviene observar que fue difícil regular las pequeñas corrientes de jugo y de lechada de cal en el aparato de Brieghel-Müller. Después de la prealcalización, las suspensiones fueron trasegadas a un depósito,

Figura 1. Volumen del filtrado, que fue filtrado por unidad de superficie filtrante, anotado como una función del tiempo.

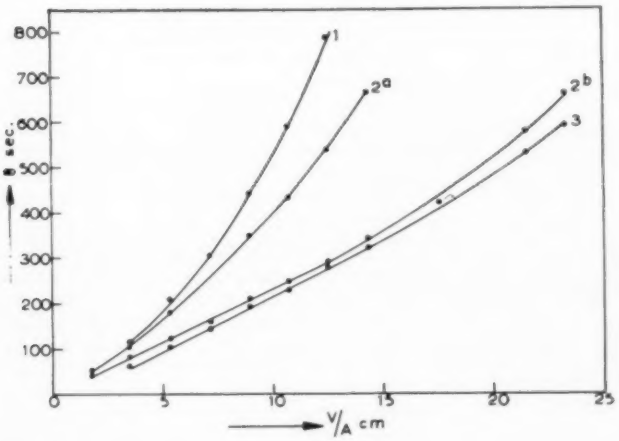
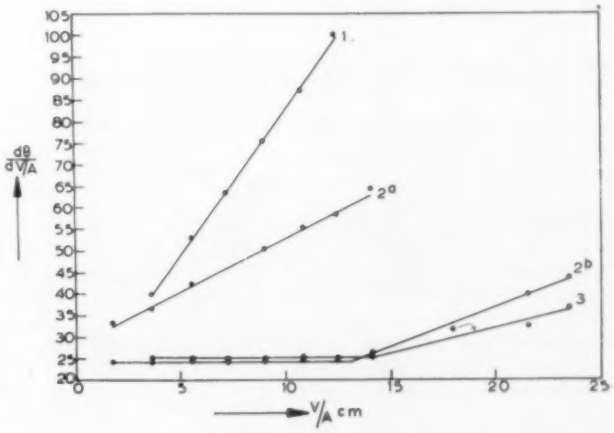


Figura 2. Primer derivado del volumen, que fue filtrado por unidad de superficie filtrante, anotado como una función de este volumen.



donde se mantuvieron a 90° C durante un período máximo de 40 minutos. Las suspensiones fueron agitadas a fin de impedir la sedimentación. La filtración se hizo con unos 100 litros de suspensión. Las suspensiones fueron trasegadas al filtro por una bomba de émbolo buzo. La presión máxima en el filtro de placas y cuadros, provisto de paños de algodón, fue de 2.5 ato. Tuvimos que acumular las suspensiones durante 40 minutos a fin de obtener bastante cantidad para un ensayo de filtración. En una fábrica donde se evitan los largos períodos de espera, la formación de color será mucha menos y se obtendrán mejores resultados. Los resultados de los ensayos en filtración se consignan en la Tabla 1, y se representan gráficamente en las Figuras 1 y 2.

En las tablas y en los gráficos se usan los símbolos siguientes:

Θ = tiempo en segundos.

V = volumen de suspensión filtrada, en litros.

$\frac{V}{A}$ = volumen de suspensión filtrada, en cm^3 por una superficie filtrante de 1 cm^2.

$\frac{d\Theta}{d(V/A)}$ = primer derivado de Θ a V/A.

$\frac{d^2\Theta}{d(V/A)}$ = segundo derivado de Θ a V/A.

Table 1

Clase de Filtración	Θ (seg.)	V (litros)	$\frac{V}{A}$ cm	$\frac{d\Theta}{d(V/A)}$	$\frac{d^2\Theta}{d(V/A)^2}$
1. Precalcalización, difusión en caliente. 0.2% CaO.	116	10	3.58	40	7
	208	15	5.37	53	7
	305	20	7.16	63	7
	444	25	8.95	75	7
	588	30	10.74	88	7
	793	35	12.53	100	7
2ª. Difusión en frío sin SO_2. 0.3% de CaO.	50	5	1.79	34	2.4
	100	10	3.59	36	2.4
	170	15	5.37	42	2.4
	343	25	8.95	50	2.4
	432	30	10.74	53	2.4
	540	35	12.53	60	2.4
	670	40	14.30	64	2.4
2ᵇ. Difusión en frío con 0.05% de SO_2.	42	5	1.79	23.5	
	79	10	3.58	23.5	
	119	15	5.37	23.5	
	156	20	7.16	23.5	
	201	25	8.95	23.5	
	245	30	10.74	23.5	
	284	35	12.35	23.5	
	342	40	14.32	26.0	1.6
	578	60	21.48	39.5	1.8
	650	65	23.27	43.0	1.8
3. Difusión en caliente después de la precalización, alcalización y carbonatación a 10.8 de pH. Consumo total de cal, 1.8%.	61	10	3.48	25	
	102	15	5.37	25	
	142	20	7.16	25	
	188	25	8.95	25	
	225	30	10.74	25	
	274	35	12.53	25	
	318	40	14.32	25	
	431	50	17.40	32	1.2
	534	60	21.48	32	1.2
	594	65	23.27	36	1.2

Tabla 2
Análisis de los Filtrados

	Difusión en frío; purificación con 0.3% de cal en total	Difusión en caliente; purificación con 1.8% de cal en total
Polarización	10.5%	11.6%
Brix	12.5°	13.1°
Alcalinidad	65 mg CaO/100 ml	67 mg CaO/100 ml
Extinción/cm 4300Å	0.502	0.255
pH	10.6	10.6
Cantidad de sales alcalinas en los filtrados después de la segunda carbonatación a 8.5 de pH y de la filtración	61.8 mg CaO/100 ml	12.4 mg CaO/100 ml

Por estos ensayos se comprobó que era posible filtrar los jugos crudos prealcalizados de la difusión en frío. La filtración de los jugos crudos prealcalizados obtenidos por difusión en frío es tan rápida como la filtración de jugos prealcalizados, alcalizados y carbonatados de la difusión en caliente. La filtración de jugos crudos prealcalizados de la difusión en caliente resulta absolutamente imposible. Por los ensayos de filtración también se comprobó que antes de matar las células con cloroformo, se debe agregar a las cosetas un poco de dióxido de azufre. (Este punto ya ha sido tratado en artículos anteriores). Sin la adición de 0.3 a 0.5% de dióxido de azufre (calculado sobre el peso de remolacha) a las cosetas, la velocidad de filtración del jugo crudo prealcalizado es inadecuada.

Los resultados de los análisis de los filtrados se consignan en la Tabla 2.

La prealcalización de jugos de difusión en frío fue efectuada con lechada de cal de 5° Bé. Esto ocasiona una dilución de jugo relativamente alta. En la difusión en caliente, la prealcalización fue efectuada con lechada de cal de 20° Bé. En este caso, la dilución del jugo crudo es relativamente menor. La alcalización principal de jugos de difusión en caliente fue efectuada con pelotillas de cal y no produjo dilución de los jugos.

Las propiedades filtrantes de los jugos prealcalizados de la difusion en frío son extraordinariamente buenas. Debido a la pequeña cantidad de cal empleada en la purificación, el color del filtrado es más intenso que el color del jugo de difusión en caliente después de su purificación con 1.8% de cal. La cantidad de cal en el jugo de difusión en frío después de la segunda carbonatación a un pH de 8.5 es mayor que el contenido de cal en el jugo clarificado obtenido por la difusión en caliente. Probablemente, esta circunstancia es el resultado de la pequeña cantidad de cal empleada en la purificación de jugos de difusión en frío.

Los autores comprobaron que los jugos de difusión en frío prealcalizados después de la filtración se pueden purificar completamente mediante permutadores iónicos. La percolación se llevó a cabo en columnas de unos 4 cm de diámetro. Una fue cargada con 200 ml de permutador catiónico Imaca CC_{12}* fuertemente ácido. La otra columna fue cargada con 300 ml del permutador

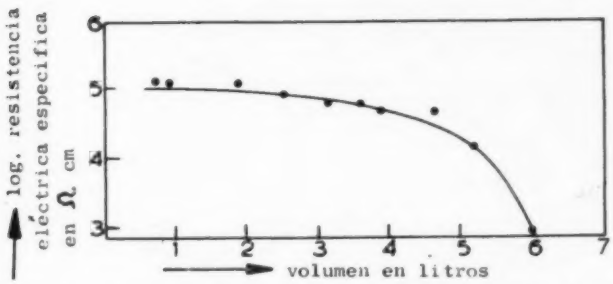


Figura 3. Logaritmo de la resistencia eléctrica específica de una muestra de 50 ml del percolado anotado como una función del volumen, que había sido percolado antes de tomar la muestra. Dicho percolado fue pasado por los permutadores catiónico y aniónico.

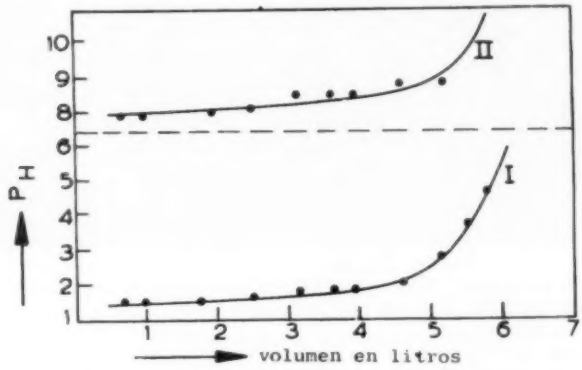


Figura 4. pH del percolado como una función del volumen que fue percolado antes de tomar la muestra (de 50 ml). La Curva I representa los valores de pH del efluente del permutatdor catiónico. La Curva II representa los valores de pH del jugo pasado por ambos permutadores iónicos.

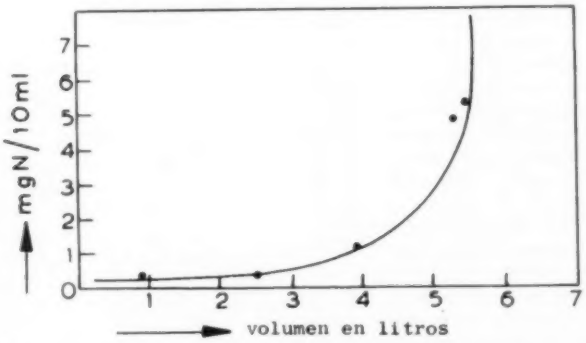


Figura 5. Contenido de nitrógeno en los jugos pasados por ambos permutadores iónicos, anotado como una función del volumen percolado antes de tomar la muestra (de 50 ml).

aniónico Imac A_{17}* moderadamente básico.

La velocidad de percolación fue de 1.5 litros/hora. Las percolaciones se llevaron a cabo continuamente. El efluente del permutador catiónico se hizo pasar por el permuatdor aniónico sin retardación. Los percolados ácidos no se recogieron. Durante la percolación se analizaron muestras de unos 50 ml de percolados. Los resultados de los análisis se representan gráficamente en las Figuras 3, 4 y 5, donde el logaritmo de la resistencia eléctrica específica, el pH y el contenido de nitrógeno en los efluentes se anotan como una función del volumen de jugo que fue percolado antes de tomar la muestra.

* Los permutadores iónicos fueron puestos a nuestro servicio por el fabricante, la Industrieele Maastschappij Activit, Amsterdam.

En la Figura 3, el logaritmo de la resistencia eléctrica específica del jugo que pasó por los permutadores catiónico y aniónico respectivamente, se anota como una función del volumen del jugo que fue percolado antes de tomar la muestra (de 50 ml). Según esta figura, parece que la resistencia eléctrica específica disminuye rápidamente después de la percolación de unos cinco litros de jugo.

En la Figura 4, el pH del percolado se anota como una función del volumen de jugo que fue percolado antes de tomar la muestra (de 50 ml). La Curva I representa los valores de pH del efluente del permutador catiónico. La Curva II representa los valores de pH del jugo que ha pasado por los permutadores catiónico y aniónico respectivamente.

En la Figura 5, el contenido de nitrógeno del jugo que ha pasado por los dos permutadores iónicos se anota como una función del volumen de jugo que fue percolado antes de tomar la muestra (de 50 ml). Según esta figura, parece que ocurre un aumento en el contenido de nitrógeno en el percolado después de la desmineralización de unos cuatro litros de jugo.

Los cuatro primeros litros del percolado están libres de color y otras impurezas. Los percolados tienen un poco de odor, que desaparece durante la evaporación. De los jugos purificados por el uso de permutadores iónicos se obtiene un azúcar perfectamente blanco después de remover el agua por evaporación. Un analisis del azúcar acusó los resultados siguientes:

Polarización **99.5%**
Centenido de azúcar invertido 0.2%
Centenido de ceniza **0.3%**

Siguiendo este proceso, no se obtienen siropes ni melazas.

La regeneración de los permutadores iónicos, después de haberse agotado, fue efectuada de acuerdo con instrucciones del fabricante. Aunque aún no hemos determinado exactamente la duración de los permutadores iónicos, parece que no ocurre pérdida de capacidad al cabo de muchos ciclos de percolación ye regeneración.

■

Convenio Internacional Azucarero en Vigor el 1° de Enero

El nuevo Convenio Internacional Azucarero concertado en Ginebra durante los meses de septiembre y octubre entró en vigor el 1° de enero de 1959.

En Convenio estipula que entrará en vigor cuando haya sido ratificado por no menos del 70% de países que representen los votos de países exportadores y el 60% de los votos de países importadores que hayan ratificado el Convenio o avisado su intención de ratificarlo, aceptarlo o de acceder a él.

La primera sesión del Consejo Internacional Azucarero bajo el nuevo Convenio se abrirá en Londres en enero 28 de 1959.

El sistema de paletización mueve el azúcar de la refinería (centro, izquierda) al punto de paletización situado cerca del centro del almacén en forma de L a la derecha.

Sistema de "Paletización" Automático

El sistema más extenso y más completo de "paletización" automática en el país fue instalado por la California and Hawaiian Sugar Refining Corporation en su refinería de Crocket, California. Esta instalación, valarada en $1,600,000, conduce el azúcar envasado desde la refinería hasta el almacén, clasifica y separa mecánicamente los sacos y cajas de distintos tamaños, carga las paletas autométicamente y las encamina del mismo modo a cualquiera de cuatro destinaciones distintas para fines de almacenaje o embarque.

En 1954, los ingenieros de la C&H, en colaboración con la Lamson Corporation, desarrollaron un diseño para una cargadora de paletas especial capaz de manejar paletas de 60 pulgs. por 44 pulgs. con cargas hasta 4,500 lbs. Esta cargadora especial, probada durante varios meses, demostró que, con ciertas modificaciones, la paletización de todos los bultos de la C&H, incluyendo cajas de embarque, sacos de papel y bolsas de papel, era factible.

Todos los sacos de 50 y 100 lbs. entran en la estación de clasificación en un transportador de banda común. El operador identifica cada bulto según pasa, y oprime un botón para identificar la línea acumuladora que le corresponde. El sistema estático General Electric se puede ver parcialmente al fondo.

En marzo de 1956, se aprobó un plan final para la instalación del sistema de paletización en dos fases. La primera, diseñada para manejar todos los productos principales embarcados en cajas y todos los fardos de 60 lbs., quedó terminada en la primavera de 1957. La segunda, diseñada para manejar sacos de 25, 50, y 100 lbs., quedó terminada en el verano de 1958.

Al presente, toda la producción envasada de la refinería (incluyendo varios productos especiales), ascendente a unas 600,000 toneladas de azúcar al año, es manejada por el sistema de paletización. Esto significa que el sistema maneja unos 120,000 bultos cada 24 horas.

Funcionalmente, la instalación incluye tres sistemas integrados para manejar los tipos principales de azúcar envasado. La producción envasada de la refinería se divide en las siguientes clasificaciones:

1. Cajas de embarque que contienen varios tipos de azúcar en cajas de cartón.
2. Fardos de papel que contienen de seis a treinta y seis bolsas de papel con azúcar granulado.

Los transportadores de rodillos activos acumulan paletas cargadas de sacos de azúcar y encaminan los bultos a las cargadoras de paletas (izquierda). A la derecha pueden verse seis bolsas de 10 lbs. siendo acomodadas en hileras entrelazadas en una cargadora de paletas.

3. Varios tipos de azúcar envasado en bolsas de papel de 25, 50, y 100 lbs.

Las cajas de embarque con azúcar envasado, que tienen un peso neto de 24 a 60 lbs., son portadas de las distintas estaciones de producción y acumuladas según el tipo de azúcar en cuatro hileras de transportadores de rodillos activos. Cuando estas líneas se llenan, son encaminadas automáticamente a una o ambas de dos paletizadoras mecánicas que forman cargas de paleta con hileras sucesivas de cajas de acuerdo con normas predeterminadas. En este caso, el ritmo de paletización oscila entre 30 y 35 cajas por minuto, según su tamaño y norma de paletización.

Los fardos de papel con un peso de 60 lbs., que contienen 12 bolsas de cinco libras o seis bolsas de diez libras de azúcar granulado, son portadas directamente de la estación de producción a tres cargadoras de paletas mecánicas. Dos de estas cargadoras se usan constantemente, mientras que la tercera se mantiene en reserva y para paletizar otros bultos como fardos con 30 bolsas de dos libras o 6 sacos de tela de diez libras. Estas cargadoras paletizan fardos a razón de 25 por minuto.

El sistema para la paletización de sacos de papel es necesariamente más complicado. La paletización de sacos de 25, 50, y 100 lbs., fue, en efecto, originada en la instalación de la C&H. Todos los sacos de 50 y 100 lbs. pasan por una estación clasificadora y separadora en su recorrido de la estación de producción a las cargadoras de paletas. Las clasificación y separación son efectuadas por un sistema General Electric estático y un operador desde un gabinete de instrumentos. El operador identifica cada saco por una señal, y los sacos son automáticamente encaminados a cualquiera de seis líneas acumuladoras por el sistema de regulación estático, a razón hasta de treinta sacos por minuto. Según cada saco llega al punto de transferencia predeterminado en el transportador de rodillos activos, es transferido automáticamente al transportador acumulador que le corresponde por medio de bandas en V continuamente en movimiento colocadas entre los rodillos de la línea troncal.

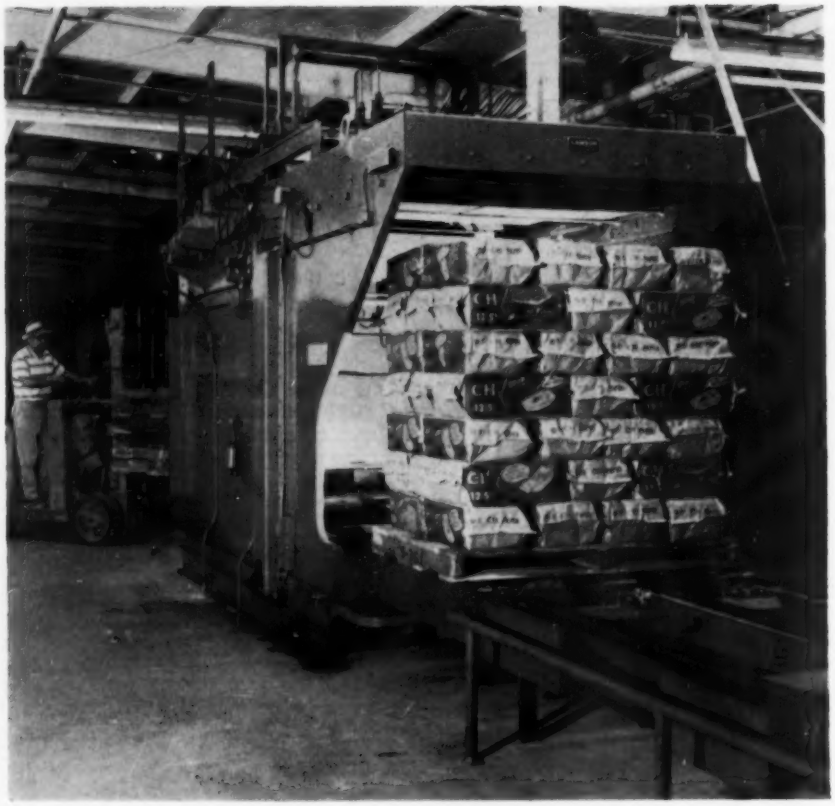
Hay diez líneas acumuladoras de sacos que abastecen las tres cargadoras de paletas. Seis de estas diez líneas acumuladoras pasan por la estación clasificadora; hay cuatro líneas de sacos que corren directamente del departamento de producción. Estas incluyen dos líneas de sacos de 25 libs. Los sacos se detienen en las líneas acumuladoras hasta que se acumulan en suficientes cantidades para formar cargas de paleta. Los sacos son dirigidos automáticamente a una de tres cargadoras de paletas designada de antemano para manejar ciertos bultos. Los ritmos de paletización para sacos son: 30 por minuto para sacos de 25 lbs.; 25 por minuto para sacos de 50 lbs.; y 20 por minuto para sacos de 100 lbs.

Las ocho cargadoras de paletas están instaladas en un punto centralmente situado en el segundo piso del almacén. Se instalaron unos 7,300 pies de nuevo equipo de conducción para traer azúcar envasado de las estaciones de envase en el segundo, tercero y cuarto pisos de la refinería a las cargadoras de paletas por un sistema de transportadores y líneas acumuladoras. La mayoría de las líneas separadoras y acumuladoras están suspendidas de vigas en el techo, a unos 40 pies de altura sobre el primer piso del almacén, con lo que se utiliza espacio que no se aprovechaba.

Cinco cargadoras de paletas manejando fardos y cajas y tres cargadoras de paletas cargadas de sacos funcionan frente por frente en lados opuestos de un transportador común de paletas cargadas. Las paletas vacías son portadas en rimeros a la estación paletizadora por un elevador automático y conducidas por carretillas de horquilla al depósito de paletas vacías en cada cargadora de paletas.

A medida que los bultos fluyen a las cargadoras de paletas, se acomodan convenientemente en hileras entrelazadas por la acción de un espárrago giratorio y un ariete regulados por un dispositivo acomodador. Entonces se retira una placa separadora debajo de la hilera, la que desciende unas cuantas pulgadas a la paleta en espera que está soportada desde abajo. Esta operación se repite para hileras sucesivas hasta formar y descargar una paleta llena.

Aquí se ven cuatro tipos de azúcar en cajas en las líneas de contadores que cuentan las unidas que forman las cargas de las paletas encaminadas a las cargadoras automáticas.



Cargadora de paletas manejando fardos. Un transportador de cadena transborda las paletas cargadas a un transportador común. Obsérvense las paletas vacías siendo entregadas al depósito de paletas detrás de la cargadora, donde puede recibir ocho paletas.

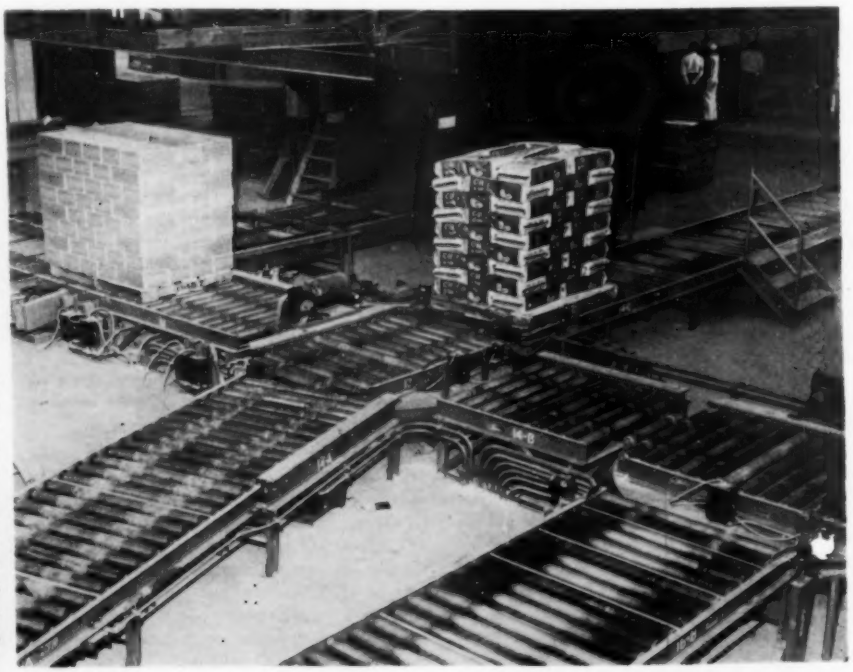
Una paleta vacía es insertada automáticamente en posición para ser cargada.

Las paletas cargadas de cajas de embarque, fardos y sacos son transferidas automáticamente de las ocho cargadoras de paletas a un transportador común que maneja las paletas cargadas. El operador de la estación puede seleccionar cualesquiera de cuatro estaciones finales preajustando un interruptor en cada cargadora. El sistema regulador recuerda el destino de cada cargadora y aun el de los distintos bultos en la cargadora. Las paletas cargadas son encaminadas por el transportador en la línea principal y una mesa giratoria a un punto en el piso donde se acumulan o a uno de tres elevadores que bajan las paletas cargadas al primer piso. Las paletas cargadas se acumulan en estos cuatro puntos, donde son recogidas por carretillas de horquilla y conducidas al almacén o a las estaciones de embarque por ferrocarril, por camión o por agua.

Como el sistema de paletización mecánica representa el medio principal de mover la producción de la refinería, un quebranto en dicho sistema implicaría tener que volver al costoso sistema de paletización manual. Por lo tanto, se ha provisto una estación de paletización auxiliar para tal eventualidad. La paciencia, visión y pericia técnica de aquellos que se ocuparon de este trabajo han sido compensadas por el hecho que la estación auxiliar ha sido usada rarars veces a la fecha excepto para fines de prueba o mientras se efectuaron ciertas modificaciones en el sistema mecánico.

A parte de las economías más patentes logradas en el manejo de materiales con este sistema, se obtuvieron varios otros beneficios. Previamente, las averías sufridas por los envases durante la paletización manual implicaban costosos trabajos de remanejo y aumentaban los costos de envase. Tales costos han sido reducidos considerablemente por el sistema de paletización mecánica. Al mismo tiempo se ha logrado mayor uniformidad y equilibrio en la carga de las paletas, lo que facilita y mejora los trabajos de almacenamiento. Ello también permite establecer programas de producción más flexibles. El arduo trabajo manual, con sus riesgos y problemas de personal, ha sido substituido con dispositivos mecánicos de mayor exactitud.

Las paletas cargadas corren en un transportador de rodillos activos (arriba, izquierda) a una de dos mesas giratorias, cada una de las cuales puede encaminar la paleta cargada hacia la derecha o la izquierda para un total de cuatro distinos finales. En el centro puede verse la primera mesa giratoria, que ha dirigido una paleta cargada hacia la izquierda.



GEORGE FLETCHER & CO LTD TALLERES MASSON LITCHURCH LANE DERBY INGLATERRA

Eliminación de la Corrosión en Tubos de Evaporadores

Ing. Ubaldo Villar

A NUESTRO ingreso en esta Cía., en los albores de 1953, fuimos informados por la superioridad del ingenio de la necesidad de buscarle solución al grave problema relacionado con la destrucción de los tubos de cobre de las calandrias del Cuádruple Efecto existente, especialmente en el vaso melador. El ataque había aumentado de intensidad en los últimos años, a tal extremo, que durante el período de reparaciones correspondiente a la zafra de 1953, se cambiaron 521 tubos.

Lo más alarmante del fenómeno lo constituía no solo el hecho de tener que reemplazar tan respetable cantidad de tubos de cobre, con lo costoso que ello resulta, sino que se dió el caso de tener que sustituir en dicho año tubos que se colocaron nuevos el año anterior.

Después de estudiar durante la zafra de ese año la manera en que se producía el fenómeno, mediante la observación de las características que presentaban los tubos dañados, hubimos de redactar un Informe donde exponíamos nuestro parecer respecto a la causa del mismo.

En este caso se consideraron tres hipótesis:

a) Teoría de la acción galvánica.
b) Teoría de la acción del ácido clorhídrico durante las limpiezas periódicas que se practicaban al Cuádruple Efecto.
c) Teoría de la acción de los gases incondensables.

En primer lugar apuntaremos que los tubos dañados presentaban invariablemente el deterioro o efecto destructivo en el tercio superior de su longitud, especialmente en la zona inmediata inferior a la placa superior de la calandria.

No se podrá aducir que la operación del mandrilado sea suficiente como para alterar la estructura interna del cobre de los tubos. Y si esto es poco, dónde están los electrolitos necesarios para que sea viable la acción galvánica?

Los animadores de esta Teoría sustentaban que la destrucción de los tubos de cobre obedecía a la reacción química de los vapores ácidos que se suponen pasan en cantidad apreciable de un Vaso a la calandria del siguiente, en virtud del sistema escalonado de calentamiento de la solución ácida que se practicaba en este ingenio, así como a la poca área que tenía la sección de la tubería de salida de los vapores a la atmósfera, lo que producía cierta retención perjudicial. A lo anterior nosotros oponíamos las razones siguientes:

a) No se explica que la acción intermitente de dicho ácido durante 8, 10 ó 12 limpiezas que se practican en una zafra, y que representa 16, 20 ó 24 horas, respectivamente, de contacto de los vapores ácidos con el cobre, sea suficiente como para destruir tubos a lo largo de una sola zafra.

b) Suponiendo que exista el agente oxidante capaz de viabilizar el ataque del ClH, y que sea posible la destrucción de tubos en el período de una sola zafra, cómo se explica que el ataque sea despiadado en la calandria del vaso melador, mucho menor en el tercer Vaso e insignificante en el segundo?

Los que estábamos abrazados a esta Teoría, nos respaldábamos en los siguientes argumentos:

a) Por las fotografías que acompañamos se puede apreciar que el ataque se produce invariablemente en el tercio superior del tubo, más bien en la zona inmediata a la placa superior de la calandria. Las caracteristicas de las estrías o canaladuras que se observan siempre nacientes en el extremo superior y dirigidas ineluctablemente hacia abajo, conducen a pensar que se forman como consecuencia de la acción continua y pertinaz de los gases amoniacales disueltos en la película de condensado que constantemente envuelve al tubo.

b) Ocurre, como se señaló anteriormente, que donde se producía el mayor ataque era en el Vaso Melador, siguiéndole después en menor escala el tercer Vaso, y siendo casi imperceptible en el segundo Vaso.

Este deterioro creciente de los tubos se explica satisfactoriamente por la acción de los gases incondensables, puesto que el jugo se va concentrando, y con esto va disminuyendo su capacidad de disolución, lo que se traduce en un desprendimiento cada vez mayor de gases incondensables.

c) Las cañas de este ingenio comenzaron a ser abonadas químicamente en el año de 1944, y esta operación fué cobrando fuerza hasta llegar a un 80% de la caña total del ingenio en el año de 1949. Desde entonces se ha seguido abonando más o menos en la misma proporción, salvo para las zafra de 1954 y 1955 en que, dadas las circunstancias restrictivas vigentes y el exceso de caña sobrante, apenas fueron abonadas.

Siendo uno de los integrantes del abono empleado el nitrato de potasio, cabe esperar que dichas cañas tengan en su jugo un contenido elevado de amino-ácidos, y son éstos los que al descomponerse por efecto de las altas temperaturas producen los gases amoniacales. De aquí se desprende que, a medida que fué aumentando el abonado de la caña, también fué aumentando el contenido de amino-ácidos en el jugo, y desde entonces se empezaron a presentar los fenómenos destructivos de que ya hemos hablado. Como se ve, coincide perfectamente la época en que la adición de abonos químicos llegó al máximo con la aparición del fenómeno deteriorante.

d) Está probado que los gases amoniacales tienen un efecto corrosivo muy marcado sobre el cobre, y ya han sido muchos los casos en que los tubos se destruyen por su parte exterior y superior como consecuencia de la acción de aquéllos.

Una de las razones más poderosas que nos asistía para considerar que eran los gases incondensables los causantes del fenómeno en cuestión, era el hecho de producirse el ataque siempre en la parte superior del tubo, o sea en la zona subyacente a la placa superior de la cribió oportunamente. Este ataque de origen químico obedece a los efectos de la corrosión producidos por los gases amoniacales en la parte del tubo bañada por el vapor. Aquellos gases, debido a su baja densidad, se elevan hasta la parte superior de la calandria, disolviéndose después en la película de condensado y formando una solución corrosiva que ataca los tubos.

e) En el diseño de una calandria, cualesquiera que sea el sistema de colocación de los diafragmas interiores que se emplee, se hace mucho hincapie en que haya una eficiente y completa extracción de gases incondensables, ya que no solamente la retención de estos puede traer como consecuencia una acción destructiva sobre los tubos, sino que forman bolsones localizados en ciertas regiones que impiden la trasmisión del calor, restando eficiencia al aparato evaporador.

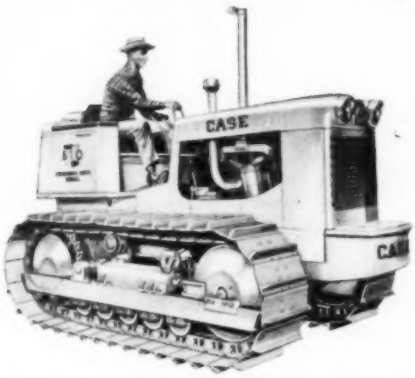
Estando convencidos nosotros, por todo lo explicado anteriormente, que el causante del deterioro de los tubos eran los gases incondensables retenidos en las calandrias, empezamos a averiguar a qué obedecía la evacuación incompleta de dichos gases, y descubrimos lo siguiente:

(*Signe en la página* 56)

TRACTOR DIESEL CASE® 900 . . .

Case 900 diesel con grada pesada de discos desplazables. Tamaños: 6 a 13½ pies.

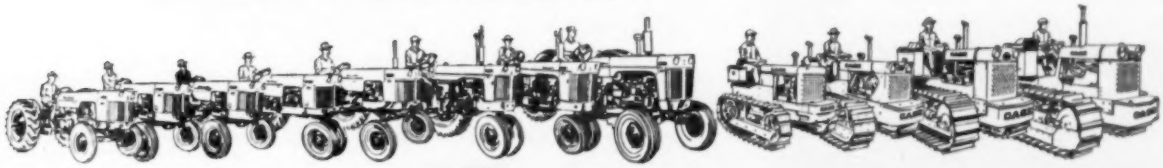
70 c. de f. para labores PROFUNDAS



Case 810 de carriles con transmisión *Terramatic* enclusiva. Cambia en *marcha* . . . ofrece DOBLE fuerza de tiro para las labores más difíciles y para arrastrar las cargas más pesadas a través de cañaverales resbaloso sin parar.

He aquí FUERZA BRUTA—cerca de 4 toneladas de peso y tracción con 70 caballos de fuerza en la barra de tiro—listos parar arar tierras duras de cañaveral PROFUNDAMENTE. Este gigante, Case 900 diesel de 6 cilindros, arrastra implementos de mayor tamaño . . . realiza trabajos pesados más rápidamente . . . y a un *costo por hectárea increíblemente bajo.* Su sistema de combustión regulada Case *Powercel* exclusivo y protección del combustible de 6 puntos le permiten arrancar en cualquier clase de tiempo . . . y ofrecen fácil funcionamiento, combustión limpia y máxima economía en combustible. Tiene 6 velocidades hacia adelante, gran radio de viraje en la barra de tiro y guardabarros completos. Sistemas de dirección mecánica y regulación hidráulica dual a opción del comprador.

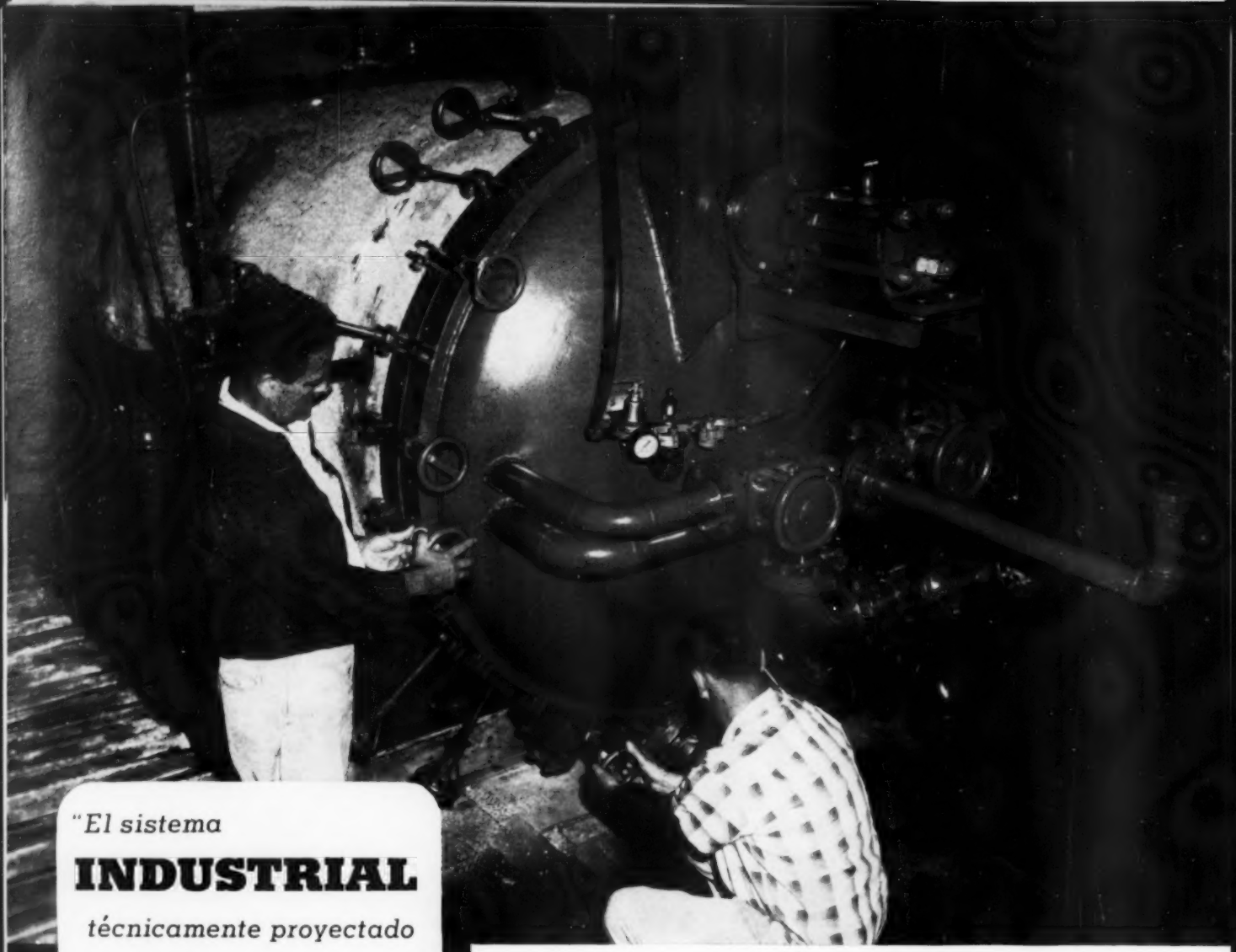
RENGLON COMPLETO DE TRACTORES CASE DE RUEDAS Y DE CARRILES . . .
Motores para el combustible que usted usa



Comuníquese con el distribuidor de Case o solicite más información de World Headquarters, Box 827, Nassau, Bahamas.

J. I. CASE INTERNATIONAL S.A.

Los Productos Case Vienen Siendo los Primeros en Calidad Durante Más de 100 Años



"El sistema

INDUSTRIAL

técnicamente proyectado ha demostrado su capacidad de aumentar la producción con menos costos de operación"

. . . dice el gerente de una fábrica de azúcar en Fellsmere, Florida.

COMPARE ESTOS RESULTADOS:

(Rendimiento en galones de miel de 63° Brix por pie² de área filtrante)

SEMANA	FILTRO INDUSTRIAL DE TIPO ESPECIAL	FILTRO CONVENCIONAL DE TIPO CORRIENTE
A	42	14.5
B	35	8.5
C	29	12.0
D	22	7.5
E	16	5.0
F	20	13.0
G	31	7.8
PROMEDIO	28	9.8

INDUSTRIAL

La ilustración muestra un filtro de tipo especial diseñado por la INDUSTRIAL para cierto trabajo en cierta planta, o sea para la filtración de licores tratados por el proceso de Sucro-Blanc en Fellsmere, Florida.

Este filtro INDUSTRIAL de tipo especial fue puesto en servicio al lado de un filtro de placas convencional de tipo corriente, con igual área filtrante, y empleado para el mismo trabajo.

Los resultados auténticos anotados en la tabla a la izquierda eliminan toda duda en cuanto a la extraordinaria eficiencia del filtro INDUSTRIAL especial. También conviene observar que durante el período de prueba, la caña fue afectado por las heladas cuatro veces por lo menos, cuyos jugos resultaron ser sumamente difíciles de manejar.

¿A qué se debe esta asombrosa diferencia? La respuesta yace, desde luego, en el esmerado diseño y su aplicación al equipo, lo que aseguró buen funcionamienti hidráulico, y limpiezas rápidas eficaces y perfectas ciclo tras ciclo. En este caso, el filtro INDUSTRIAL produjo TRES VECES el rendimiento del filtro convencional de igual tamaño. A la inversa, esto significa que la frecuencia de las precapas fue reducida a un tercio, lo que redujo considerablemente los costos de auxiliar filtrante y de trabajo.

Diríjase a la INDUSTRIAL *para que le demuestre cómo los sistemas técnicamente diseñadps pueden resolver sus problemas de filtración.*

INDUSTRIAL FILTER & PUMP MFG. CO.
5928 Ogden Avenue, Cicero 50, Illinois, E.U.A.

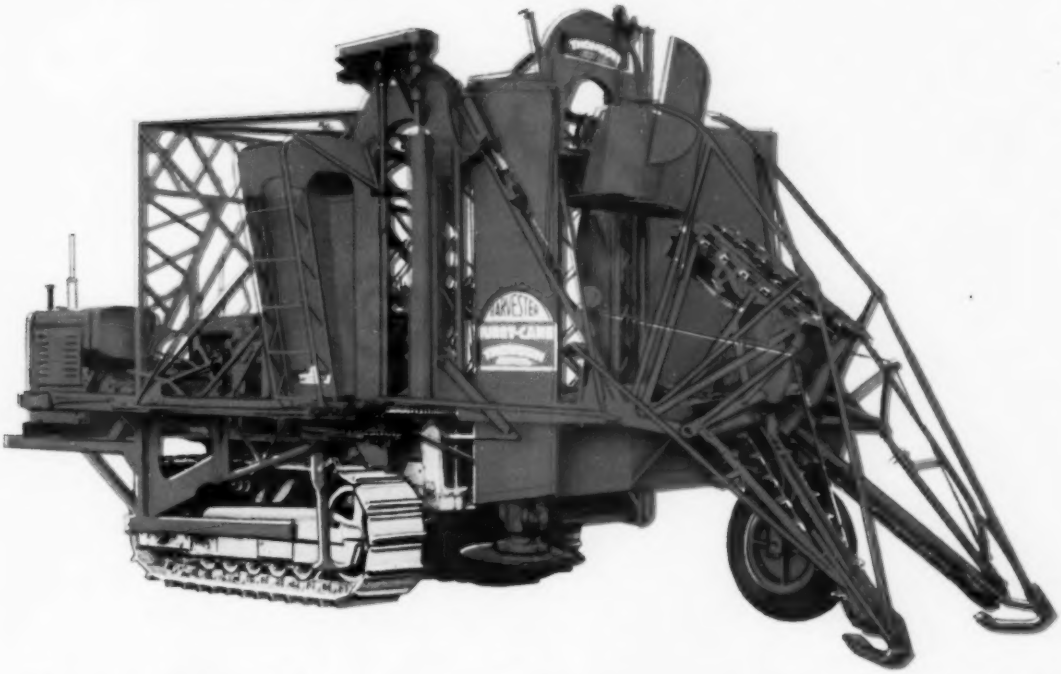
Filtros a Presión • Equipo de Intercambio Iónico • Equipo para el Tratamiento de Residuos

S-258SP

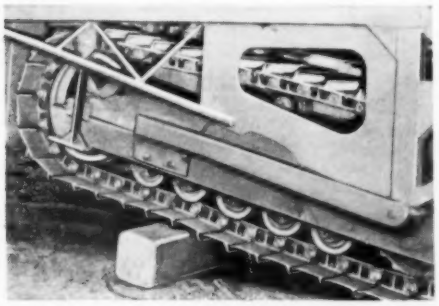
RECOLECTORA THOMSON

Semi-Montada para Tractores de Carriles...

ALLIS-CHALMERS HD-6
CATERPILLAR D-4
INTERNATIONAL TD-9



Nueva Aplicación para una Recolectora "Tipo Lousisiana" en Regiones con Terrenos Quebrados o de Regadío



LA ARTICULACION THOMSON UNICA (arriba) permite que los carriles oscilen normalmente.

LA RUEDA DELANTERA (abajo) es portada a través de zanjas de riego y de desagüe.

He aquí una eficiente recolectora probada en el manejo de caña ahora a disposición de cosecheros de caña con terrenos quebrados o de regadío que exigen el uso de tractores de carriles. La suspensión en tres puntos, con la rueda delantera al frente del disco cortante, ofrece uniformidad en la colección de los tallos de caña y en la altura de corte. La cadena "Sticker" conduce la caña a través de la máquina con facilidad. Todas las operaciones de esta nueva máquina han sido probadas con éxito campaña tras campaña en centenares de recolectoras HURRYCANE en Louisiana.

THOMSON MACHINERY COMPANY, INC.
THIBODAUX, LOUISIANA, U. S. A.

Corrosion

(*Viene de la página* 52)

Que los seis tubos bajantes del vaso melador, a continuación de las "patas de araña", que se utilizaban para la extracción de los gases incondensables y que están conectados a la placa superior de la calandria, uniformemente distribuidos, eran del tipo perforado. Es decir, presentaban orificios pequeños a distintos niveles, pero sin embargo adolecían del defecto de tener el tramo superior, de unas 6" de longitud, sin perforaciones. Debido a que la extracción resultaba insuficiente, siempre quedaba una gruesa capa de gases que tenían dificultades en salir, por lo que éstos se quedaban "lamiendo" los tubos, dañandolos. Véase la vista lateral de la Fig. 1.

Que la sección del tubo de salida común adonde convergen las "seis patas de araña" resultaba muy reducida para el desalojo completo de los gases, especialmente en los últimos años debido al incremento de la caña abonada que se muele.

Que el fenómeno destructivo en el vaso melador siempre se manifestaba en la región opuesta a la entrada de vapor (Véase Fig. 1), o sea, todos los tubos deteriorados se sacaban de dicha parte. Conviene destacar que la calandria de dicho Vaso carece de diafragmas (baffles) interiores y esto impide la adecuada orientación del vapor y de los gases. Esto daba lugar a que los gases se arrinconaran en dicha zona, formando grandes bolsones que no podían ser extraidos debidamente.

Que la llave de la tubería de los gases incondensables de la calandria del tercer Vaso, estaba muy cerrada, y en esa forma la venían trabajando desde muchos años atrás. La citada tubería estaba conectada a la cúpula del vaso melador.

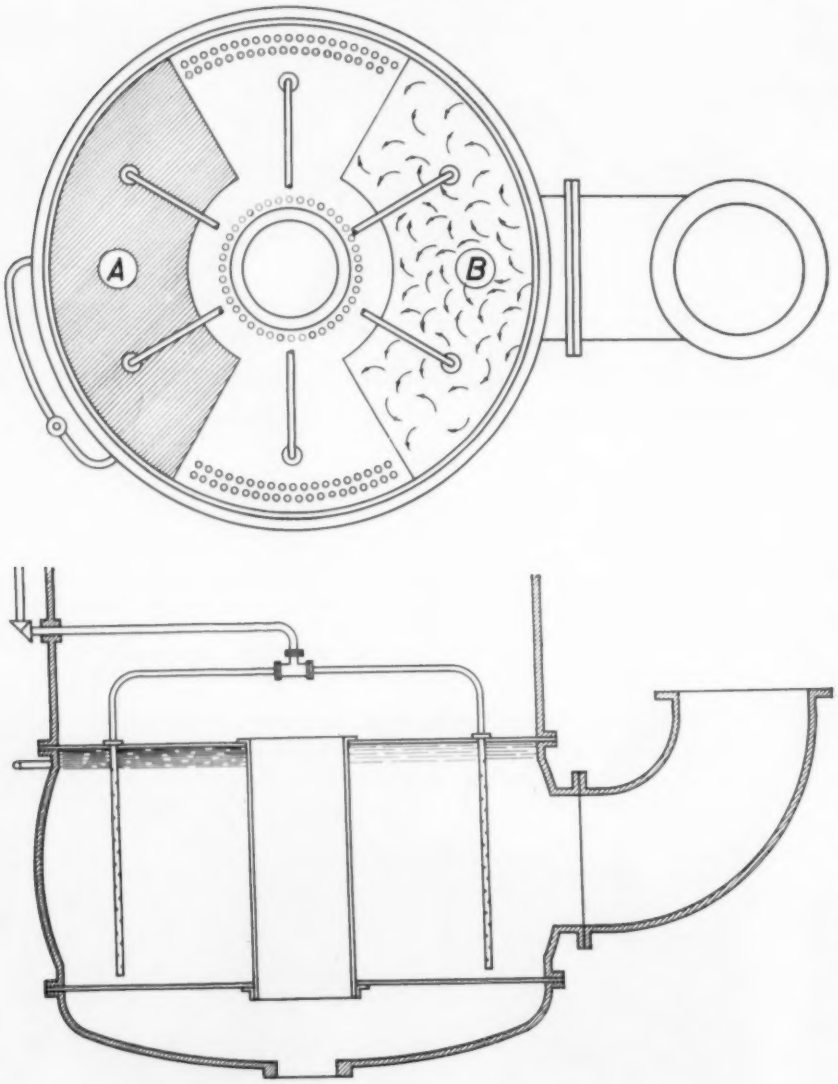
Por todo lo anterior se llegó a la firme conclusión de que la extracción o evacuación de los gases incondensables resultaba deficiente y al mismo tiempo insuficiente. Para poner término a una y otra cosa se practicaron los siguientes trabajos y operaciones:

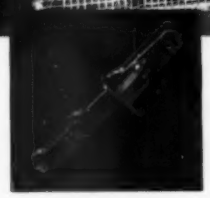
1) En el período de reparaciones correspondiente a la zafra de 1954 suprimimos los seis tubos bajantes perforados conectados a la placa superior de la calandria. De esta manera no hay posibilidad de que quede una capa de gases retenida como venía ocurriendo antes.
2) En el período de reparaciones correspondiente a la zafra de 1955 se instaló la toma auxiliar para extraer gases incondensables que aparece en la vista de planta de la Fig. 1. Obsérvese que se procedió a colocarla en la zona donde se concentraban los gases y donde, consecuentemente, era mayor el efecto destructivo. Dicha tubería se conectó a la línea de evaporación del vaso melador al condensador.
3) Se aumentó la abertura de operación de las válvulas situadas en las tuberías de extracción de los Vasos III y IV (Melador). A partir de la zafra de 1955 se abrieron más las válvulas ubicadas en las líneas de extracción de gases incondensables de las calandrias.

Hemos querido esperar pacientemente al desenvolvimiento de cuatro zafras, a partir de la de 1954, para informar sobre los resultados obtenidos. Estos no han podido ser más elocuentes.

Compárense las cifras contenidas en las Tablas I y II que acompañamos, donde hemos consignado una relación de los tubos de cobre cambiados en cada año, incluyendo Reparaciones y Zafra. En la Tabla I aparecen los tubos sustituidos hasta la zafra de 1954, inclusive, en que aun no habíamos instalado la toma adicional de gases. En la Tabla II aparecen los últimos cuatro años, incluyendo hasta la zafra de este año. Obsérvese como ha ido decreciendo la cantidad de tubos dañados, aunque probablemente se sigan "declarando" algunos en los próximos años debido a que ya vienen afectados desde años atrás. Durante la zafra recién concluida, y su período de reparaciones correspondiente, no tuvimos necesidad de cambiar un solo tubo.

Figura 1: A representa la zona de máxima concentración de gases en la calandria a través de la parte superior del vaso. B representa la zona de máxima turbulencia. El tubo visto abajo a la izquierda en el diagrama superior da salida a los gases incondensables que causaban el deterioro de los tubos. El diagrama inferior muestra la elevación lateral de esta parte del vaso.





Cadenas para Conductores de Bagazo, *tipo de rodillos de acero con aletas para tablillas. Disponibles en aceros semialtos en carbono, debidamente tratados al calor para darles la solidez y resistencia al desgaste necesarias. Cuatro modelos básicos con resistencia a la tensión de 28,000 a 55,000 lbs.*

Cadenas para Conductores de Caña, *tipo de rodillos de acero. Cinco modelos básicos con resistencia a la tensión de 47,000 a 125,000 lbs. Piezas de acero semialto en carbono o grados de aleación, tratadas al calor para asegurar la solidez y resistencia al desgaste necesarias. Las tablillas usadas con este tipo de cadena son hechas en acero de 1/4", 3/16" o No. 10. Cuatro tipos. Largos de 24" a 108", en aumentos de 6".*

Solamente las piezas Jeffrey de repuesto para cadenas son idénticas al equipo Jeffrey original

Cuando las piezas de cadenas Jeffrey tienen que ser repuestas, es importante que las reparaciones se hagan con Piezas de Repuesto Jeffrey Genuinas, puesto que son idénticas a los componentes originales en diseño, dimensiones y material, y que están hechas para funcionar perfectamente con los demás componentes de la cadena.

Las piezas de repuesto Jeffrey prestarán el mismo servicio seguro y económico que el equipo original. De modo que cuando usted necesite reponer las piezas gastadas en una cadena Jeffrey, lo *más* económico será hacer la reposición con Piezas de Repuesto Jeffrey Genuinas asequibles del Distribuidor de Jeffrey en su localidad. The Jeffrey Manufacturing Company, 916 North Fourth Street, Columbus 16, Ohio, E.U.A.

Solicite el catálogo 934

Seleccione lo que necesite de este catálogo de 64 páginas, que describe todo el renglón Jeffrey de equipo para centrales azucareros —comenzando con el manejo de la caña hasta la entrega del producto acabado.

JEFFREY

DIVISION DE EXPORTACION

EQUIPO DE CONDUCCION • DE ELABORACION • PARA MINAS • MAQUINARIA PARA TRANSMISION DE FUERZA • FABRICACION POR CONTRATO

La union hace la fuerza

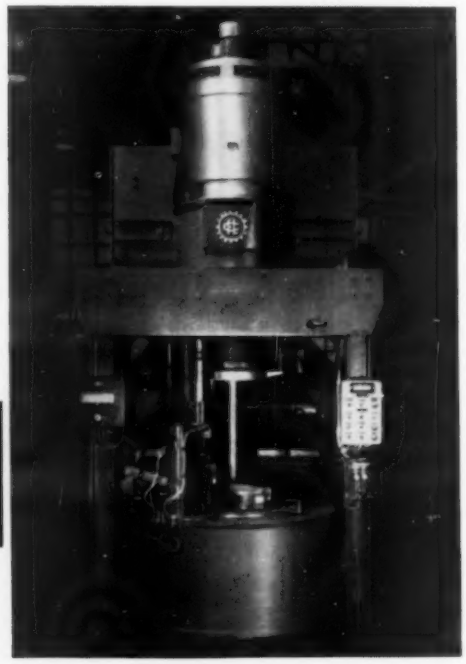
• • • **FIVES-LILLE** *y* **CAIL**
(1861) (1812)

los 2 mas antiguos constructores franceses de maquinaria azucarera han unido sus potentes medios de estudios, de investigaciones y de produccion

FIVES LILLE-CAIL

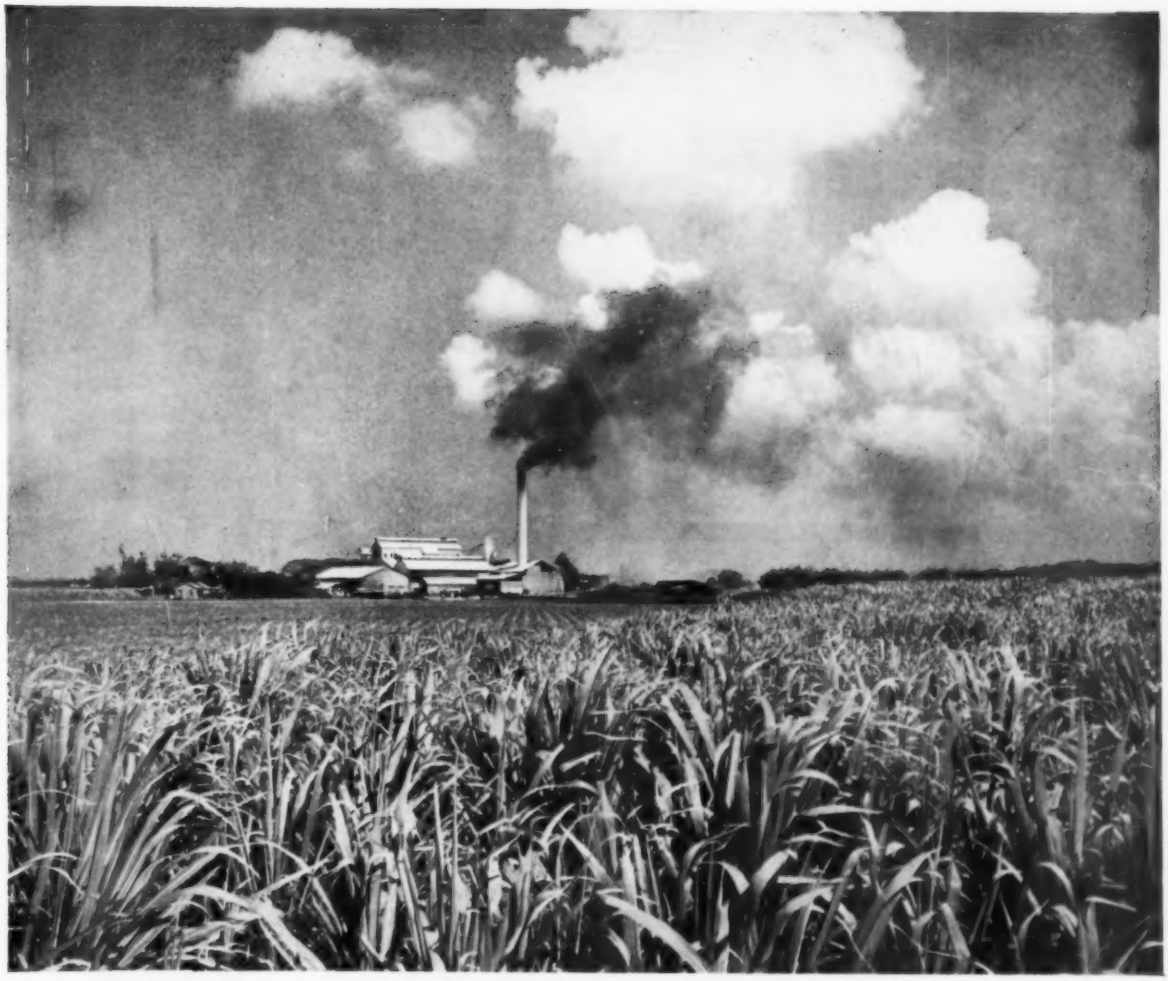
pone sus cuatro fabricas empleando 10.000 personas
al servicio de la industria azucarera

Una de sus realizaciones :
la CENTRÍFUGA COMPLETAMENTE AUTOMÁTICA
- *mando por grupo Ward-Leonard*
- *control electrónico*
- *producción óptima con masas cocidas de todos grados*



S^TE FIVES LILLE - CAIL
7, rue Montalivet, PARIS (8e) - Tél. : ANJou 22-01 et 32-40

S A G · PARIS



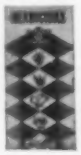
¡PRODUCTORES DE CAÑA!

Mejoren su posición frente a la competencia utilizando los HERBICIDAS DIAMOND

El alza en el costo de producción y la competencia, cada vez más aguda, constituyen dos factores que militan contra las utilidades del productor de caña de azúcar.

Los herbicidas Diamond, por ejemplo, pueden afectar de modo decisivo el rendimiento de sus cosechas y las correspondientes ganancias. Estos herbicidas químicos realizan un trabajo mucho más eficiente que los procedimientos antiguos corrientes que extermina la maleza, — ¡y a la mitad del costo! Es más, al destruir las hierbas que minan el suelo, privando a los cultivos de valiosos elementos nutritivos y del indispensable acervo de humedad — que además dan albergue a multitud de plagas de insectos destructores — y aumentan el costo de la labranza — obtendrá Ud. cultivos *más sanos* y *más robustos*.

Permítanos comunicar su nombre a nuestro distribuidor en esa plaza. El puede suministrarle la información necesaria acerca de los productos agrícolas Diamond — como si fuesen socios comanditarios, que trabajan provechosamente para Ud. Al mismo tiempo podremos enviarle el Boletín PS-001, absolutamente gratis. Este boletín, que trata del mejor modo de utilizar los herbicidas, contiene también cuadros de recomendaciones y muchos otros datos de suma importancia y utilidad para Ud.



Diamond Alkali Inter-American Corporation

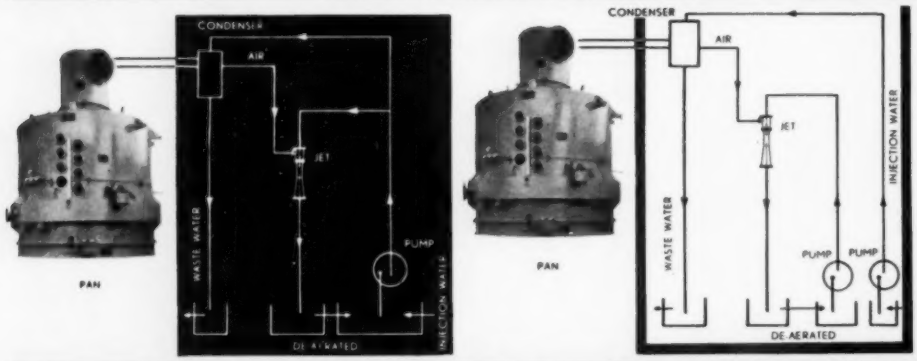
ROOM 1614 — 99 PARK AVENUE, NUEVA YORK 16, N. Y., E. U. DE A.

Dirección cablegráfica: DIAMALKALI

En esta edad del cohete...

¿por qué no seguir la marcha?

DISPOSICION ESQUEMATICA



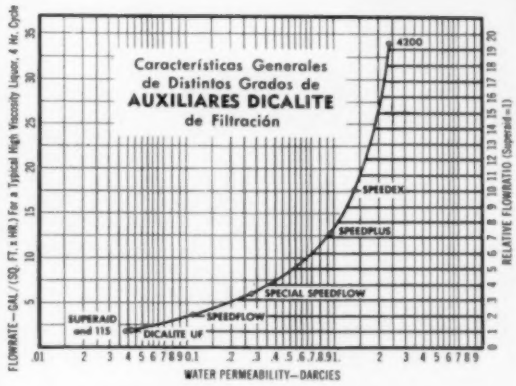
Provea sus Tachos Stork-Werkspoor al Vacío y sus Evaporadores Stork-Werkspoor con el Sistema Stork-Werkspoor de **Remoción de Aire a Chorro de Agua**

Sencillo y Barato

No tiene piezas vivas. No necesita agua adicional. Un solo orificio . . . no tiene múltiples inyectores pequeños que se atasquen.

Para maquinaria azucarera en general, dirijase a Gebr. Stork & Co. N. V., Hengelo, Holanda.

STORK V·M·F **WERKSPOOR**
HENGELO AMSTERDAM



EN REFINERIAS DE AZUCAR DE CAÑA

Licores Crudos Lavados	Speedplus, Speedflow
Sirope Crudo de Afinación	Speedplus, Speedex
Crudo Alto Derretido—	Speedplus, Special Speedflow, Speedex
Crudo Lavado, H_3PO_4 defecado	Speedplus, Speedex
Azúcar Líquido	Speedplus, Speedflow

EN FABRICAS DE AZUCAR DE REMOLACHA

Jugo Clarificado	Speedex
Jugo Concentrado	Speedplus, Speedex
Azúcar Líquido	Superaid
Miel de Malta, 30° Baumé—	Speedplus, Special Speedflow
Miel de Malta, 10° Baumé	Speedplus

¡Difícilmente!

Como los licores de azúcar varían tanto en filtrabilidad, no sería lógico esperar que un *solo* auxiliar de filtración produjese resultados satisfactorios en todos ellos.

Por ello, Dicalite ofrece gran variedad de grados de auxiliares de filtración de alta calidad; cada cual posee características especiales y propias velocidades de flujo; todos son cuidadosamente preparados para asegurar su uniformidad y eficacia partida tras partida.

El gráfico a la izquierda indica la eficacia relativa de 8 de los principales grados de Dicalite, mientras que las listas que lo siguen indican cómo dicen los azucareros que usan los distintos grados de Dicalite para mantener la estación de filtros a paso con el resto del departamento de elaboración.

Para asegurarse de que usted está obteniendo máxima eficiencia en su proceso de filtración, comuníquese con el ingeniero local de Dicalite, quien le proporcionará los datos que usted necesite sin compromiso alguno.

Dependable GLC GREAT LAKES Dicalite® DIATOMACEOUS MATERIALS

DEPARTAMENTO DICALITE • GREAT LAKES CARBON CORPORATION • 612 SOUTH FLOWER STREET, LOS ANGELES 17, CALIFORNIA, E.U.A.

Nuevos Aditamentos, Nuevos Modelos

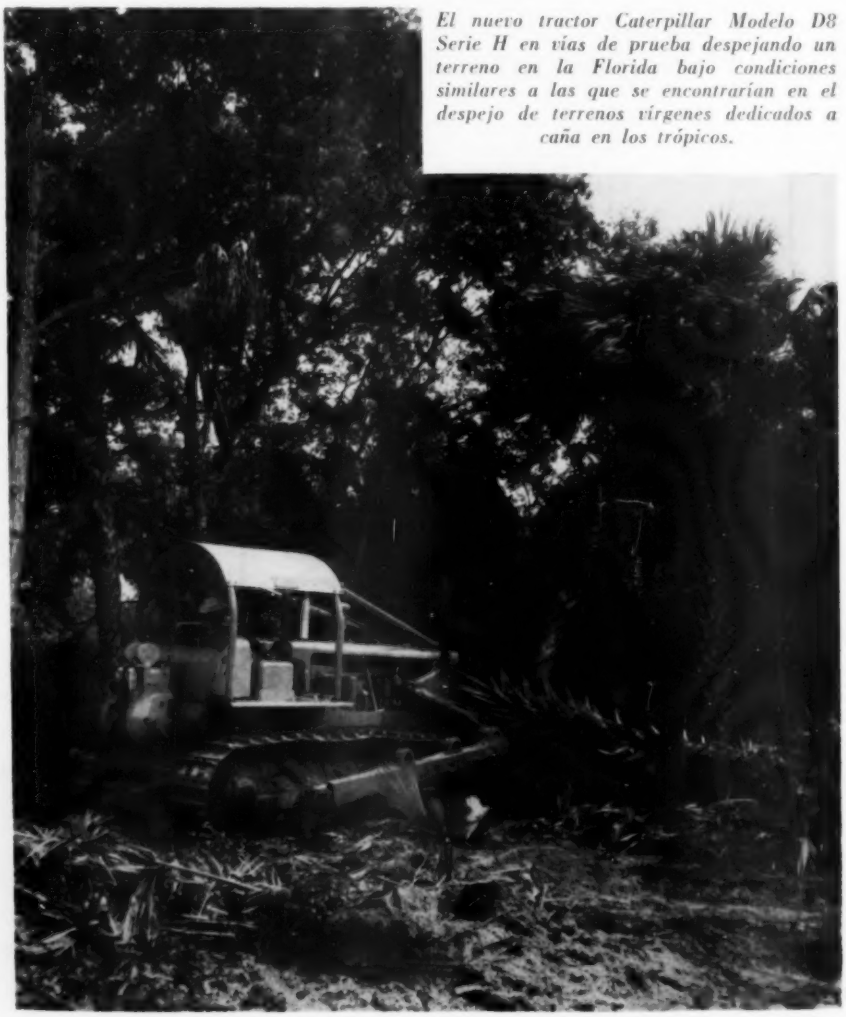
Adelantos en Tractores para la Industria Azucarera

Cargadora de caña simplificada concebida por la J & L Engineering Company para uso en el tractor Caterpillar Modelo D4 empleado en los cañaverales de Louisiana para cargar caña.

RECIENTEMENTE, la Caterpillar Tractor Company anunció desde sus oficinas generales y desde Jeanerette, Louisiana ciertas innovaciones en su renglón de tractores y equipo de especial interés para la industria azucarera. Entre el nuevo equipo se encuentra una combinación de cargadora y zanjadora construída por la J & L Engineering Company y adaptada para uso en el tractor Caterpillar D4 que desarrolla 50 caballos de fuerza en la barra de tiro. La cargadora incluye un sistema hidráulico completamente amortiguado, mandos simplificados y detalles de construcción que la hacen más segura y le ofrecen mayor visibilidad al operador, todo con miras a elevar la eficiencia en los trabajos de carga de caña. Su resistente botalón tubular también se puede usar para abrir zanjas y en la conservación de sistemas de riego en los cañaverales. Esta construcción tubular hace que el botalón de la cargadora se pueda convertir fácilmente en un brazo lateral completamente hidráulico para trabajos de excavación, el que se puede desmontar fácilmente cuando se quiere devolver el tractor a los trabajos usuales de cañaveral. El arpeo de carga, con una capacidad de 1500 libras, incluye dientes reemplazables de aleación de acero tratado al calor, en el que se eliminaron por completo los refuerzos donde se atrapaba la basura. La J & L Engineering también construye aparatos apiladores para uso en el tractor Caterpillar D4. Uno de ellos es el apilador vertical tipo de cadena que levanta y arrolla la caña según avanza el tractor; el otro es el apilador de empuje no mecánico que amontona la caña en una pila.

La Caterpillar también anunció un nuevo tractor Modelo D8, Serie H, para trabajos pesados. En este nuevo modelo, propio para el despejo de terrenos bajo las condiciones más severas y para la roturación profunda de suelos duros, se aumentó la potencia (caballos de fuerza), el peso y el espacio libre o despejo. Se ofrece con convertidor de torsión o con transmisión directa. Desarrolla 180 caballos de fuerza en la barre de tiro. El nuevo modelo incluye un turbocargador y un filtro de aire de tipo seco que provee aire limpio en los rudos trabajos de cañaveral y requiera mucha menos atención. Seis velocidades hacia adelante y seis hacia atrás aceleran el movimiento de este nuevo modelo. El tractor emplea un sistema común de lubricación y utiliza aceite de motor únicamente de un depósito común de suministro. Los rodillos y poleas de los carriles vienen herméticamente lubricados para toda la vida. Las modificaciones de diseño aumentan la visibilidad y comodidad del operador. Los ensayos realizados en el campo de pruebas de Peoria, Illinois, acusan un aumento de 20% en la cantidad de trabajo realizado por el nuevo tractor Caterpillar D8 Serie H, comparado con el viejo Modelo D8 que viene a substituir.

El nuevo tractor Caterpillar Modelo D8 Serie H en vías de prueba despejando un terreno en la Florida bajo condiciones similares a las que se encontrarían en el despejo de terrenos vírgenes dedicados a caña en los trópicos.



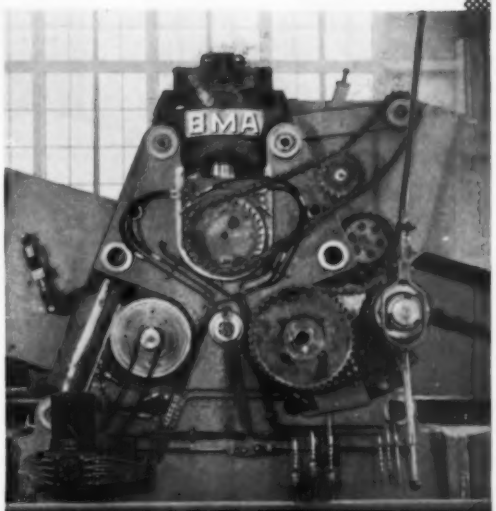
BMA

Los molinos de caña

son de construcción moderna y resistente, cuyos resultados han sido sumamente satisfactorios en la industria de azúcar de caña.

Especialidades del molino BMA de chumaceras simples:

- Las nuevas armazones triangulares engoznadas permiten altas cargas en la maza superior
- Cambio rápido de las mazas, levantando la culata hidráulica o las tapas laterales
- Chumaceras sumamente ajustadas que aseguran perfecto funcionamiento
- Lubricación central para todos los molinos



El molino de cojinetes de rodillos, con transmisión de 3 ejes diseñada por la BMA, también ha dado buenos resultados debido a la sencillez de los métodos de conservación.

Estas plantas de molienda modernas han sido suministradas a la América Central y América del Sur, así como a Asia Meridional. Solamente en el curso de los últimos tres años, hemos montado 8 fábricas de azúcar de caña completas en la India.

BMA 122

BRAUNSCHWEIGISCHE MASCHINENBAUANSTALT

BRAUNSCHWEIG · ALEMANIA OCCIDENTAL

Fábricas completas desde más de 100 años para:

Azúcar de remolacha y azúcar de caña, así como para fábricas de alcohol, levadura, almidón, substancias para curtidos y aceites vegetales.

4 PUNTOS QUE TENER EN MENTE!

Norit consejo práctico donde quiera y cuando quiera que se necesite

Norit representantes en todos los países para acelerar los embarques

Norit calidades propias para toda condición local

Norit carbones activados siempre a precios de competencia

NORIT

NO-4-26

UNITED NORIT SALES CORPORATION LTD. AMSTERDAM - HOLLAND

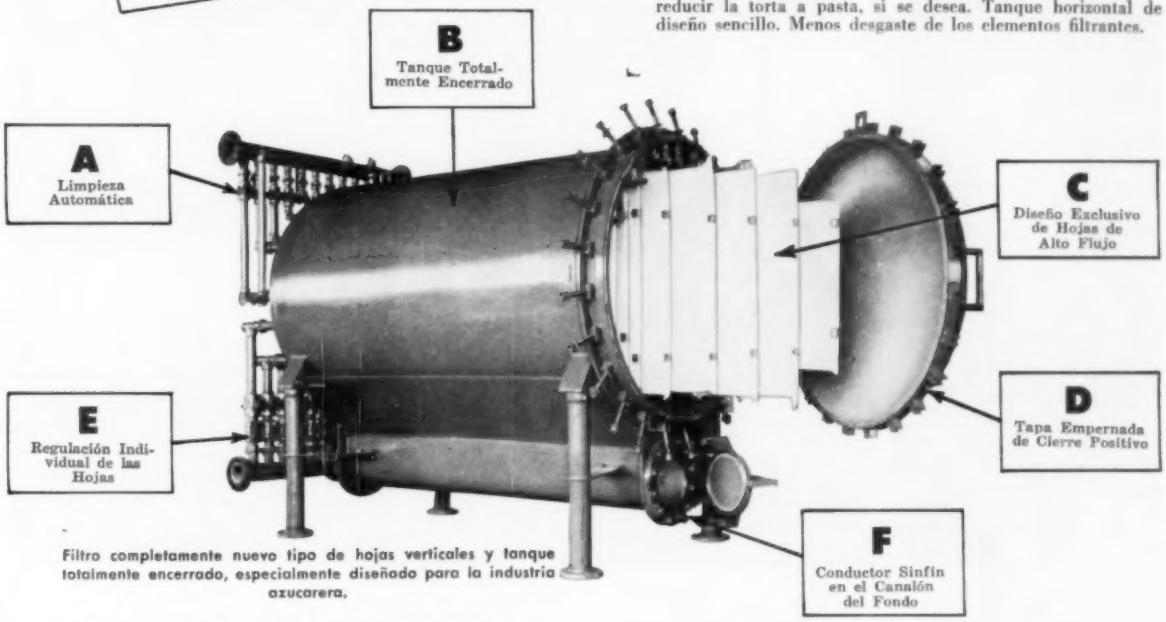
SPARKLER *Presenta* SU NUEVO FILTRO MODELO RSC

VENTAJAS DE FUNCIONAMIENTO EXCLUSIVAS

Mejor Regulación de la Calidad—Cristales visores, grifos para extraer muestras, y válvulas de regulación individuales para cada hoja, lo que permite regular la calidad continuamente. Si cualquiera de las hojas deja de funcionar debidamente, se puede cerrar sin interrumpir el trabajo del filtro.

Se Necesita lo Mínimo en Personal—Una sola persona inexperta puede operar una batería grande de filtros RSC, incluyendo la adición de material filtrante, limpieza, precapa y superintendencia.

Limpiezas Más Rápidas y Más Fácil Conservación—Un filtro Modelo RSC de 560 pies cuadrados de área filtrante se puede limpiar en 10 a 15 minutos (30 a 45 minutos de tiempo muerto). Las hojas se limpian a chorro individualmente. El conductor sinfín en el canalón del fondo descarga la torta agotada por una pequeña lumbrera. También puede reducir la torta a pasta, si se desea. Tanque horizontal de diseño sencillo. Menos desgaste de los elementos filtrantes.



Filtro completamente nuevo tipo de hojas verticales y tanque totalmente encerrado, especialmente diseñado para la industria azucarera.

CARACTERISTICAS DE DISEÑO EXCLUSIVAS

A El filtro se lava por chorros internos. Se puede proveer de válvulas independientes para funcionar individualmente en casos de baja presión.

B No ocurren fugas, derrames ni contaminaciones arrastradas por el aire. Asegura una estación de filtros nítida, limpia y aseada. El filtro se puede aislar para reducir las pérdidas de calor al mínimo. Se puede instalar en lugares de poca altura y en espacios reducidos.

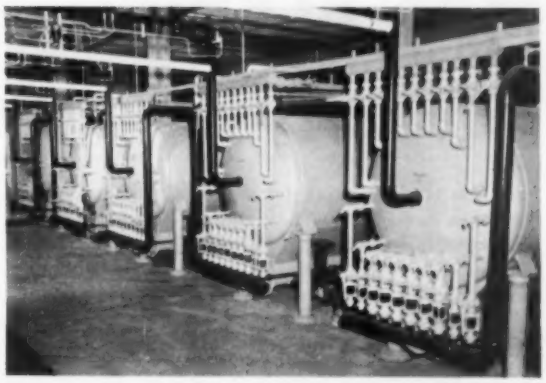
C Las hojas rectangulares, verticales, aseguran precapas uniformes y máximo flujo por unidad de área filtrante. Son insuperables en resistencia y durabilidad. Vienen montadas en carros con rodillos para facilitar su inspección y remoción; no necesitan pernos ni otros medios de fijación. Se cierran automáticamente en el filtro. Disponibles en acero inoxidable, recubiertas de tela sintética de larga duración o con tela de alambre de acero inoxidable.

D Tapa empernada en bisagra doble que da fácil acceso al interior del aparato sin remover las hojas. También se puede obtener tapa de abertura rápida operada hidráulicamente.

E Válvulas de regulación individuales en las salidas de las placas, cristales visores y grifos para la extracción de muestras. Cualesquier placa o placas se pueden cerrar sin interrumpir el trabajo del filtro.

F El conductor sinfín en el canalón del fondo descarga la torta agotada fácil y rápidamente sin abrir el tanque. La torta se puede reducir a pasta, si se desea.

TAMAÑOS HASTA 1020 PIES CUADRADOS DE AREA FILTRANTE



Batería de cinco filtros Modelo RSC de 300 pies cuadrados de área filtrante en servicio en la Union Sugar Co., Betteravia, California, E.U.A.

Dirija su consulta a la Sección Azucarera

SPARKLER

Manufacturing Co., Mundelein, Illinois, E.U.A.

Sparkler International Ltd., Leliegracht 9, Amsterdam-C, Holanda
Talleres en el Canadá, Holanda, Italia y Australia
Diseño y construcción exclusivamente de equipo filtrante durante más de 30 años

MAS ACERO . . . *Millones de toneladas adicionales de las plantas Bethlehem*

Para que las industrias del mundo dispongan de más acero, la Bethlehem está ensanchando rápidamente la capacidad productiva de sus fábricas en los Estados Unidos de Norteamérica.

Por ejemplo, la gran fábrica de Sparrows Point (la mayor del mundo situada a orillas del mar), tendrá pronto una capacidad de producción anual que excederá en 2,000,000 de toneladas, la capacidad que tenía hace pocos años. En esta planta, en el puerto de Baltimore, los productos de exportación pueden ponerse directamente a bordo del buque.

El aumento de producción significa que habrá mayores cantidades de productos de acero disponibles para la exportación. Significa, además, que las serviciales oficinas y representantes de la Bethlehem en todo el mundo, podrán servirle a Ud. mejor y con más prontitud que nunca antes. Bethlehem Steel Export Corporation, 25 Broadway, New York 4, U.S.A. Cablegramas: "BETHLEHEM, NEWYORK."

Representada en todas las principales ciudades del mundo por las oficinas y representantes de la Bethlehem Steel Export Company

En Cuba: Bethlehem Steel Export Company, S. A.
Edificio Ambar Motors, Avenida Menocal y 23, Habana

La Bethlehem suministra a los mercados del mundo, acero en todas las formas, inclusive

BARRAS ★ ACEROS DE ALEACION ★ ACERO PARA HERRAMIENTAS ★ ACERO EN PLANCHAS ★ PERFILES PARA CONSTRUCCION ★ LAMINAS ★ PLETINAS ★ HOJALATA ★ TUBOS ★ PRODUCTOS DE ALAMBRE ★ VARILLAS ★ RIELES

★ BETHLEHEM STEEL ★

704S

Extractos de Publicaciones Azucareras

Publicados bajos los Auspicios de la

Sociedad Internacional de Tecnólogos Azucareros de Caña

por Arreglo Especial con

SUGAR y AZUCAR—Dr. O. W. Willcox, Redactor Técnico

Agronomía

Incendios en Cañaverales: Causas y Compensación

K. H. EDMONDS, *South African Sugar Journal*, Vol. 42, No. 4, págs. 483-485 (1958).

En 1949, la South African Cane Growers Association (Asociación de Cosecheros de Caña de África del Sur) instituyó una cooperativa para asegurar a sus socios contra incendios en los cañaverales. Los datos estadísticos de estos incendios indican que la Red Ferroviaria Africana presenta el mayor peligro contra los cañaverales; no obstante, el 25% de las reclamaciones presentadas a la cooperativa fueron el resultado de incendios premeditados con diversos fines, como para quemar la maleza o los rastrojos, que se extiendieron fuera de control. Los ferrocarriles en las centrales y el escape de los motores de tractores figuran entre otros factores que contribuyen a estos incendios. El número menor de incendios ocurre entre los meses de noviembre a junio, cuyos daños oscilan alrededor de £500 al mes. Los meses de mayor peligro son durante los meses de julio a octubre, inclusive, cuyos daños alcanzan un promedio de £2,000 al mes. El mayor número de incendios ocurre durante el mes de septiembre.

La organizacion y operaciones financieras de esta cooperativa, concebida para asegurar a sus asociados contra las pérdidas ocasionadas por incendios en sus cañaverales, son muy interesantes. Cada socio de la Asociación pasa automáticamente a ser socio de la cooperativa de seguros; su prima de seguro (de dos peniques por tonelada de caña) se incluye en la cuota anual pagable a la Asociación, con lo que se eliminan las comisiones cobradas por agentes de seguros. El valor de los daños es determinado por comités locales, mientras que el costo de estas determinaciones asciende a menos de tres por ciento del valor de tales daños. Dentro de este sistema sencillo y económico, la cooperativa ha pagado todas las reclamaciones desde el primer año de su institución hasta el presente, y durante ese tiempo ha acumulado una reserva ascendente a más de £100,000, lo cual es más que suficiente para cubrir las pérdidas anticipadas.

■

Nuevas Observaciones Sobre Herbicidas Selectivos

R. L. WAIN, *South African Sugar Journal*, Vol. 41, No. 3, págs. 227; 229 (1958).

Pocos años acá, los únicos herbicidas usados con éxito para matar los yerbajos eran ciertas "hormonas" químicas, como 2,4-D y MCPA, las que, por regla general, dañaban las plantas de hoja ancha y no afectaban los cereales ni otras plantas de la familia de las gramíneas, la que incluye la caña de azúcar.

Recientemente se observó que la capacidad de ciertos productos químicos de matar la maleza depende menos de la naturaleza del producto que de la planta. Esto significa que si se asperjan distintas plantas con ciertos ácidos grasos, todas absorberán parte de estos ácidos. En algunas plantas, los ácidos permanecen inalterados y resultan inofensivos; en otras, los ácidos se descomponen por las enzimas en la propia planta y se transforman en toxinas, que luego matan la planta.

Se sabe, por ejemplo que los productos MCPB y 2,4-DB ejercen este efecto tóxico en la mayoría de yerbajos comunes de hoja ancha, pero que son inofensivos cuando son absorbidos por guisantes, alfalfa y otras plantas de la familia de las leguminosas, así como de la familia de las gramíneas.

Los cosecheros de caña ya disponen de bastantes herbicidas contra los yerbajos de hoja ancha, de modo que los nuevos herbicidas selectivos tienen escasa aplicación en el cultivo de la caña. Tal vez puedan ser de interés indirecto, por cuanto se pueden usar para matar yerbajos de hoja ancha en cosechas de legumbres producidas para uso como abono verde. Esto

La U. S. Steel Diseña y Suministra Almacenes Económicos para Azúcar a Granel Conforme a Especificaciones del Comprador

Los diseños basados en la experiencia de la U. S. Steel y necesidades del comprador elevan la eficiencia en almacenes de azúcar a granel. La rigida construcción de la armazón (a la izquierda) elimina los soportos interiores y permite utilizar el piso plenamente. El diseño especial de los pares en tres secciones hace que se puedan armar rápidamente y facilitan los embarques por mar; hace que la armazón pueda resistir vientos ciclónicos hasta 150 millas por hora. Además, las estructuras de acero ofrecen las siguientes ventajas: protección contra incendios, mayor duración y menos gastos de conservación. Para datas sobre las economías dables por los almacenes de acero, escriba a: 100 Church Street, Nueva York 8, N. Y., E.U.A.

USS **United States Steel Export Company**

TRADEMARK

lo qué
deben saber los
FABRICANTES
de AZUCAR
acerca de los
FABRICANTES
de ACERO
y
viceversa

Los fabricantes de azúcar pueden ahorrar miles—y aun millones — de dólares, si conocen a los fabricantes que suministran sus productos de acero . . . si saben hasta qué punto, estos fabricantes, conocen la industria azucarera. La St. Mary viene sirviendo la industria azucarera desde 1900 — suministrando piezas de equipo y plantas completas que demuestran que conocemos *sus* necesidades. Antes de iniciar cualquier trabajo de construcción, renovación o ensanche, conozca *mejor* a los expertos de la St. Mary en acero y azúcar . . . así como a su personal técnico en diseño, ingeniería y fabricación. Escríbannos, y les contestaremos inmediatamente con datos completos.

DISEÑO
INGENIERIA
FABRICACION

durante medio siglo

ST. MARY IRON WORKS
FRANKLIN, LOUISIANA E. U. A.

1900 1910 1920 1930 1940 1950

en todo el mundo

aseguraría mayor contenido de materia nitrogenada cuando esta. cosechas de abono verde se cubren con el arado previo a nuevas siembras de caña.

■

Tecnología

Azúcar Blanco de Caña por el Proceso de Carbonatación

YING-CHEN CHIN, *Taiwaiian Sugar*, Vol. V, No. 7, págs. 13-17 (1958).

La fábrica de azúcar de caña Cheluchien en Formosa está fabricando azúcar blanco de calidad equivalente a la de azúcar refino corriente (Pol 99.6-99.9, humedad menos de 0.05, ceniza sulfatada 0.041, azúcar reductor menos de 0.05, color y sedimento como en refino corriente) por el proceso De Haan de carbonatación modificado.

En este proceso de carbonatación modificado, el jugo mixto se prealcaliza continuamente (a 55° C) a 10.5 de pH y se envía al tanque de primera carbonatación, donde se carbonata por espacio de 7-8 minutos en vez de 4-5 minutos, y se filtra. El jugo de primera carbonatación filtrado se envía al tanque de segunda carbonatación, el cual está provisto de una bomba de circulación de alta velocidad para asegurar la perfecta mezcla de dicho jugo. Esta segunda carbonatación es continua; período de retención, 7.6 minutos; absorción de gas CO_2, 95%; CaO precipitado, 251 mg/litro.

Anteriormente, el método de cochura usado en esta fábrica para la fabricación de azúcar blanco de ingenio consistía en el uso de azúcar de tercera doble purgado como semilla para azúcar de segunda, y azúcar de segunda purgado una sola vez para azúcar de primera. El producto final de este azúcar generalmente contenía una cantidad considerable de ceniza. Este sistema fue modificado como sigue: todo el azúcar de tercera doble purgado se derrite y se invierte en miel cruda para su sulfitación y filtración; el azúcar de segunda (a ser usado como semilla para azúcar de primera) se purga dos veces como sigue: cuando los cristales (obtenidos por la inyección de semilla) se desarrollan a la mitad del tamaño anticipado en el azúcar de segunda, la templa de masa parcialmente cristalizada se purga una vez; este azúcar purgado una vez (llamado "semilla menuda") se mezcla con miel de primera para formar un magma y luego se eleva al tamaño de grano deseado de azúcar de segunda, inyectando más miel de primera; este azúcar de segunda purgado dos veces (semilla gruesa) se usa como semilla para azúcar de primera, el que se purga dos veces, como de costumbre. Esto reduce el contenido de ceniza al límite exigido para "cristal blanco superior."

Una etapa crítica en este proceso es la filtración de la mezcla sulfitada de azúcar de tercera doble purgado y de la miel cruda antes de pasar al tacho al vacío. Con los filtros Sparkler RSC 560 se obtiene extraordinaria claridad, empleando 50 lbs. de Hyflo Supercel (como precapa y semilla de cuerpo) por ciclo de filtración de 7-10 horas, 55° Brix, miel de 65° C, y velocidad de flujo de 5.45 g.p.m.

Es necesario ejercer cuidado para mantener el color y la sedimentación dentro de los límites deseados. Debe emplearse vapor agotado en vez de vapor vivo para lavar los tachos, y el primero debe pasarse por un separador de aceite; esto evitará la posibilidad de caramelización. Para eliminar las partículas de herrumbre, es preferible que éstas se colecten en un tanque pequeño y luego se devuelvan al jugo mixto. Todos los canalones, transportadores y otras superficies que vienen en contacto con la miel filtrada y azúcar cristalizado deben ser de acero inoxidable, cobre o metal galvanizado, por lo menos; y como norma general, el proceso se debe mantener perfectamente limpio.

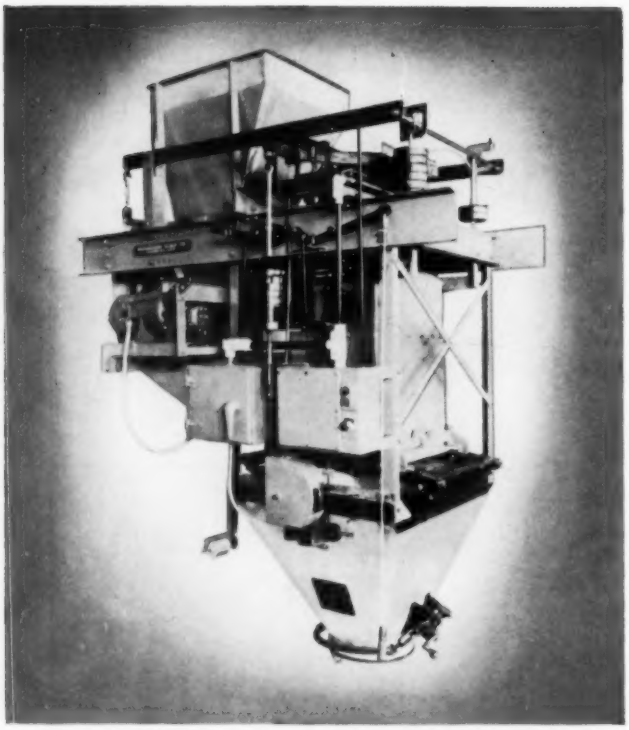
MODERNICE PARA MAYOR CAPACIDAD

SUBSTITUYA MAQUINAS INADECUADAS CON ENGRANAJES Y TURBINAS FULTON A VAPOR

Los ENGRANAJES y TURBINAS FULTON A VAPOR le brindan potencia segura para mover sus molinos a más altas velocidades de molienda . . . día tras día. Este equipo está robustamente construído para resistir muchos años de molienda a máxima capacidad . . . y es diseñado a la orden según sus necesidades para asegurar un funcionamiento uniforme, exento de dificultades.

COMUNIQUESE CON FULTON AHORA PARA RECOMENDACIONES SIN COMPROMISO ALGUNO—MODERNICE UN MOLINO A LA VEZ O TODO EL TANDEM DE UNA VEZ

FULTON DESDE 1852 **FULTON IRON WORKS CO.** ST. LOUIS 10, MISSOURI, E.U.A.



Las Básculas Richardson se ajustan a las Normas H-44 de Pesos y Medidas de EE. UU. *para su protección.*

Modernice su fábrica con equipo Richardson para el manejo eficiente de azúcar a granel

Optima velocidad—gran capacidad—peso exacto. Estos son sólo unos cuantos de los beneficios que puede obtener en su fábrica utilizando la BASCULA AUTOMATICA J-39 PARA AZUCAR CRUDO ALIMENTADO POR BANDA. Su bajo costo de instalación y conservación y su alta eficiencia se traducen en mayor rendimiento y economía para usted. En efecto, el equipo Richardson amortiza su costo en poco tiempo.

La Báscula J-39 funciona dentro de un margen de exactitud de ¼ a 1%, y realiza las pesadas tanto a granel como en sacos. Se obtienen hasta 400 pesadas por minuto, y más aún, en el caso de sacos de 100 y 200 libras.

Su construcción de acero inoxidable evita la corrosión y asegura lo máximo en asepsia. Estas máquinas se limpian fácilmente con vapor o agua caliente.

Diríjase a la Richardson para más información sobre la Báscula J-39 o básculas de mayor capacidad para mando a distancia, pesadas en libras o kilos y ajuste automático de la tara, y con los instrumentos que se necesiten.

Richardson

MATERIALS HANDLING BY WEIGHT SINCE 1902

RICHARDSON SCALE COMPANY, CLIFTON, NEW JERSEY

Sucursales de Ventas y Servicio en las Principales Ciudades.
También se Fabrican en Europa Conforme a Normas de EE. UU.

El Método Danés de Escaldar la Remolacha

T. WINTZELL, *Comunicaciones* de la Swedish Sugar Corporation, Vol. 14, No. 2, págs. 15-25 (1958).

Generalmente se entiende que cuando las cosetas de remolacha se hierven a una temperatura bastante alta para destruir las células sacaríferas, éstas sueltan el azúcar libremente en el agua circulante. Esta idea ha sido incorporada en el diseño de difusores horizontales y de columna. Por ejemplo, el primer difusor tipo RT instalado en Suecia permitía escaldar las cosetas entrantes con ocho a diez veces su volumen de jugo caliente (76° a 77° C) extraído del cilindro difusor antes de que pasasen las cosetas crudas al proceso regular de difusión. Este proceso de escalde también es una característica de la nueva planta Buckan instalada en 1957 en la fábrica de azúcar de Morbyland. Aquí, el volumen de jugo hirviente circulado es tres veces el de jugo de extracción. La temperatura de difusión es 76° C, y el período de retención de las cosetas en la artesa o batea de escalde es de nueve minutos.

La técnica de escalde adoptada para el diseño de la artesa de difusión recientemente introducida por la Danish Sugar Corporation presenta nuevas características.

El difusor danés es una simple batea inclinada, y no incluye medio alguno para preescaldar las cosetas, las cuales son introducidas en el difusor por un extremo en dirección opuesta a la corriente del jugo crudo, que es hervido a 70° C y entra por el otro extremo. Cuando el jugo caliente viene en contacto con las cosetas frías, la temperatura del primero baja 18° o 25° C, según la temperatura en el exterior. Sin embargo, dentro de 2½ minutos, y después de recorrer unos seis pies dentro del difusor, la temperatura de las cosetas se eleva a la misma temperatura del jugo entrante (70° C) y conserva esa temperatura hasta el final.

Lo sorprendente aquí es que las células sacaríferas pueden ser eficazmente destruídas a 70° C, y que esta temperatura es suficiente para coagular los constituyentes proteínicos del jugo. Estas proteínas quedan tan tenazmente retenidas en la pulpa que no se obtiene precipitado alguno cuando el agua de circulación es acidificada con ácido sulfúrico; entonces, el jugo de difusión contiene menos impurezas nitrogenadas. Se entiende que ocho de estas unidades serán instaladas en fábricas americanas para la campaña de 1958.

■

Aspectos de Seguridad en la Operación de Calderas y Turbinas

D. S. SHANN, *Memoria*, Queensland Society Sugar Cane Technologists, Vol. 25, págs. 109-114 (1958).

La experiencia acumulada hasta la fecha en la operación de turbinas a vapor para generar energía eléctrica y mover molinos de caña es la suficiente para revelar la norma general de funcionamiento de estas turbinas. En cuanto al empleo de turbinas para mover molinos de caña, la industria azucarera de Queensland está pasando por una etapa cada día más grave de rápido y serio deterioro de los componentes de turbinas, lo que aparentemente se debe a los efectos conjuntos de la corrosión y la erosión. No menos de ocho fábricas en Queensland han experimentado esta dificultad; en una fábrica (en 1957), una etapa de la turbina falló por completo.

Hay dos factores principales que pueden afectar el ritmo de deterioro de los elementos internos de una turbina, que son: Contaminación del vapor con substancias corrosivas, y la presencia de exceso de humedad en el vapor. Si el vapor se conserva recalentado, no ocurrirá corrosión alguna, puesto que las substancias corrosivas serán expulsadas en forma de polvo seco o de gas, sin ejercer efecto abrasivo ni corrosivo, pues es un hecho que

aquellas fábricas que emplean vapor recalentado en las turbinas, apenas han experimentado dificultad alguna por los efectos de la corrosión ni la erosión.

Conviene tener presente que la calidad y pureza del vapor dependen mayormente de la condición del agua de alimentación de las calderas. Es absolutamente esencial que el pH del agua de alimentación de las calderas en la fábrica se mantenga a un nivel seguro (8.5-10.5). Es especialmente durante períodos de altos coeficientes de evaporación, cuando el pH del agua en las calderas desciende a un nivel bajo, que éstas deben recibir inmediata atención individual.

■

Libros

Cálculos Básicos para la Industria Azucarera

Por J. EISNER. Publicados por *Booker Brothers McConnell & Co.*, Londres E.C. 4; folleto de 24 páginas (1958).

Este folleto en inglés, titulado "Basic Calculations for the Sugar Industry", fue preparado para uso de capataces en fábricas de azúcar encargados de su operación y precesos que no disponen de suficiente tiempo para estudiar extensos libros de texto, los cuales incluyen, a fin de asegurar absoluta exactitud, toda clase de datos que ofuscan el tema principal. Las condiciones en fábricas de azúcar varían tanto de día y aun de minuto a minuto que la exactitud de los cálculos se presta a dudas y aun puede conducir a errores. En tales casos, las aproximaciones razonables sin atención a pormenores ni refinamientos serán, en muchos casos, "suficientes" y reflejarán más claramente los datos esenciales para la mejor comprensión del hombre práctico. El folleto no pretende abarcar todos los aspectos ni métodos de fabricación, pero cálculos básicos en él descritos se pueden aplicar fácilmente a casos y problemas análogos. Entre los temas tratados en el folleto figuran la extracción y elcalización del jugo, jugos y mieles clarificados, azúcar crudo y miel final, sistemas de cochura, exigencias de vapor, generación de vapor y fuerza, superficies térmicas, condensadores, etc.

■

Manual de Compañías Azucareras

Editado por CHARLES G. KITTNER; 34ª edición publicada por *Farr & Co.*, New York; 327 páginas; $4.00.

Esta 34ª edición de "Farr's Manual of Sugar Companies", en inglés, ofrece información al día sobre la estructura económica, activos y pasivos, estadísticas de divendos, datos de producción de compañías azucareras nacionales y extranjeras que venden sus azúcares en el mercado norteamericano, incluyendo Hawaii, Puerto Rico, Islas Vírgenes y Filipinas. También incluye datos sobre otras empresas azucareras importantes en países como México, América Central y América del Sur, la República Dominicana y otros países en la región del Caribe, el Canadá, Irlanda, Inglaterra, y varias otras en el Emisferio Oriental. Los datos estadísticos incluyen la producción de azúcar de caña y de remolacha para consumo en Estados Unidos, producción mundial azucarera, precios del azúcar en plaza durante los últimos tres años, derechos de importación, embarques de mieles finales, y precios máximos y mínimos de acciones de empresas azucareras. Buena parte del manual se dedica a la distribución de cuotas azucareras para el mercado norteamericano y a las cuotas bajo el Convenie Internacional Azucarero.

SPECIFY ELTON

LA CORREA BA-50
de 50' x 24"

Esta hacinadora fue recientemente embarcada a THE GREAT WESTERN SUGAR CO.

Distintivos:
* Levaje mecánico
* Engranajes transmisores cerrados
* Anchos y largos de banda a escoger
* Perfecto diseño y equilibrio
* Disponibles en tipos de autopropulsión

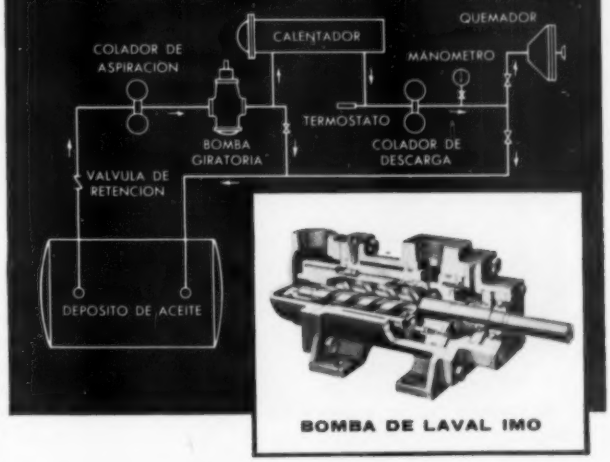
Estas son varias de la razones porqué empresas como la GREAT WESTERN SUGAR eligen equipo ELTON.

*Escriba al Depto. 8 para más información

THE CHANTLAND COMPANY
HUMBOLDT, IOWA U.S.A.

Fabricantes de Equipo para el Manejo de Materiales en Industrias Modernas

¿Substituyendo bagazo con aceite pesado?



Si usted está cambiando de bagazo a aceite combustible grado C, le conviene obtener más información sobre la Bomba de Laval IMO, especialmente diseñada para manejar flúidos viscosos pesados. Escríbanos hoy mismo solicitando catálogo, y díganos cuántos galones de aceite desea bombear y la presión que necesita.

DE LAVAL *Steam Turbine Company*
903 Nottingham Way, Trenton 2, New Jersey, E.U.A.

DL 430

Reunión de Tecnólogos en Azúcar de Remolacha

La próxima reunión de The American Society of Sugar Beet Technologist tendrá en el Hotel Utah, Salt Lake City, Utah, del 2 al 5 de febrero de 1960, exactamente un año a partir de la fecha actual. El programa de la reunión estará a cargo de Ralph Wood de la Estación Experimental de la Great Western Sugar Company en Longmont, Colorado. Los presidentes de las seis secciones de trabajo son:

AGRONOMIA: (A) Mark B. Berrett, Director de Investigaciones, Farmers & Manufacturers Beet Sugar Association, Second National Bank Bldg., Saginaw, Michigan.

GENETICA & MEJORA DE VARIEDADES: (B) George E. Rush, Fitopropagador, Amalgamated Sugar Company, Nyssa, Oregon.

ENTOMOLOGIA & FITOPATOLOGIA: (C) Dewey Stewart, Jefe Sección de Remolacha, Departamento de Agricultura de EE.UU., Beltsville, Maryland.

INGENIERIA AGRICOLA: (D) Roy Bainer, Departamento de Ingeniería Agrícola, Universidad de California, Davis, California.

QUIMICA & OPERACIONES FABRILES: (E) R. M. McCready, Encargado Químico, Sección de Remolacha, División Occidental de Fomento y Estudio Sobre Usos, 800 Buchanan St., Albany 10, California.

FISIOLOGIA: (F) J. L. Haddock, Científico en Suelos, Estación Experimental Agrícola en Utah del Departamento de Agricultura de EE.UU., Logan, Utah.

■

Nuevo Catálogo de Trapiches Farrel

La Farrel-Birmingham Company acaba de publicar un hermoso folleto ilustrado repleto de datos técnicos sobre sus molinos de caña o trapiches. La portada trae una fotografía en cuatro colores del trapiche recientemente construido por la Farrel para el Central Romana en la República Dominicana. Un interesante detalle del nuevo tándem de dieciocho mazas de 38 por 84, con una capacidad nominal de molienda de 7,000 toneladas cortas al día, es que cada molino va pintado de un color distinto para facilitar su montaje en el central.

Una sección del folleto trata del procedimiento o etapas seguidas en la modernización de instalaciones existentes. La sección de datos técnicos incluye una serie de gráficos de much utilidad en la determinación de la potencia que se necesita bajo diversas condiciones de trabajo. Estos gráficos se basan en un método de cálculo conbido por Miguel Ch. Varona. El folleto, designado como Bolétin #312, se ofrece gratuitamente a aquellos relacionados con la industria azucarera.

Los motores Brook son construidos conforme a las normas de la NEMA (Nat. Elec. Mfrs. Assn.) para servicios pesados y para funcionar continuamente a temperaturas extremas. Estos motores han establecido un envidiable récord en la industria azucarera mundial impulsando desmenuzadoras, bombas, circuladores, centrífugas, granuladores, elevadores y transportadores. Usted no puede obtener un motor mejor, aunque **su costo es menor** que el de motores corrientes. Solicite folleto descriptivo.

MOTORES DE 1 A 600 C.F.

Abiertos y a Prueba de Goteo, Totalmente Cerrados y Enfriados por Ventilador, Totalmente Cerrados Sin Ventilador, con Brida NEMA o Brida "D", con Eje Largo para Bombas, y Especiales.

Representantes de la Brook en o cerca de casi todos los centros productores de azúcar en el mundo.

BROOK MOTOR CORPORATION

3553 W. Peterson Ave., Chicago 45, Ill., E. U. A.

Desde 1904

BROOK MOTOR CORPORATION

ADVERTISER'S INDEX

February 1959

American Air Compressor Corp. 42
Arms, Richard W. 42
ASEA 8
Bellingham & Stanley Ltd. 41
Bethlehem Steel Export Corp 66
Braunschweigische Maschinenbauanstalt . . 63
Brill Equipment Company 42
Broadbent & Sons Ltd., Thomas 20, 44
Brook Motor Corporation 72
Case Company, J. I. 53
Caterpillar Tractor Company—
Inside Back Cover
Chantland Manufacturing Company 71
Combustion Engineering, Inc. 19
Darco Dept., Atlas Powder Co. 17
De Laval Steam Turbine Company 71
Diamond Alkali Inter-American Corp. . . . 59
Dicalite Div., Great Lakes
Carbon Corp. . . . 61, Outside Back Cover
Dorr-Oliver, Inc. 1
Ewart Chainbelt Co., The 16
Falk Corporation, The 9
Fletcher & Company Ltd, George . . . 22, 51
Fly Ash Arrestor Corp., The 35
Fontaine & Co. GMBH 41
Fulton Iron Works Company 69
Gelb & Sons, R. 42
General American Transportation Corp. . . 4
Henderson & Co. Ltd., John M. 41
Industrial Filter & Pump Mfg. Co. 54
Jeffrey Manufacturing Co., The 57
Johns-Manville 11
Leffingwell, Roy J. 42
Link-Belt Company 7
Lunkenheimer Company, The—
Inside Front Cover
Martin-Markham 12
Masson, E. C. 42
Minneapolis-Honeywell 21
Mirrlees Watson Co. Ltd., The 14
Norit 18, 64
Process Engineering & Development Co. . . 6
Richardson Scale Company 70
Rose, Inc., E. A. 42
St. Mary Iron Works 68
Smith & Co. Ltd., A. & W. 5
Societe Fives Lillie-Cail 58
Sparkler Manufacturing Company 65
Squier Corporation, The 10
Stanhope, Inc., R. C. 42
Stein Equipment Company 42
Stewart & Co. Ltd., Duncan 13
Stork-Hengelo 60
Thomson Machinery Company, Inc. 55
United States Steel Export Company . . . 67
Watson Laidlaw & Co. Ltd. 16
Western States Machine Co., The 3
Willys-Overland Export Corp. 15
Wright Chemical Corporation 37

4 OPERACIONES

para obtener mayores cosechas en terrenos irrigados

Estas son vistas tomadas en la Hacienda "El Nilo" de los Sres. Guillermo y Mario Sol en El Salvador, C. A.

OPERACION No. 1 Antes de que los terrenos cultivables y tierras inservibles puedan ser eficazmente irrigados, se necesita hacer mucho trabajo preliminar. Esto incluye desmonte, trabajos de nivelación con bulldozer, rellenos de hondonadas y construcción de zanjas para irrigación y drenaje.

OPERACION No. 2 La hierba y maleza se desmontan, el nuevo terreno se rompe y las superficies húmedas se secan utilizando este Tractor Cat D4 equipado con una Rastra de Discos Rome.

OPERACION No. 3 El terreno de cultivo se ara y el residuo de la cosecha se mezcla con la tierra para que ésta pueda formarse fácilmente. El terreno puede trabajarse nuevamente utilizando una rastra de discos.

OPERACION No. 4 La arena se acondiciona cuidadosamente para distribuir el agua uniformemente sobre la superficie y controlar el promedio de drenaje. El Tractor D4 de carriles deja una huella ligera sobre el terreno manteniéndolo flojo y poroso.

Los Tractores Diesel Caterpillar se emplean para todas estas operaciones y los propietarios explican el por qué: "Mayor flotación y tracción en terrenos húmedos; suficiente potencia y excelente servicio."

¡Solicite al Distribuidor Caterpillar próximo en su área que le muestre las numerosas ventajas que usted también puede obtener con el uso de equipo Caterpillar!

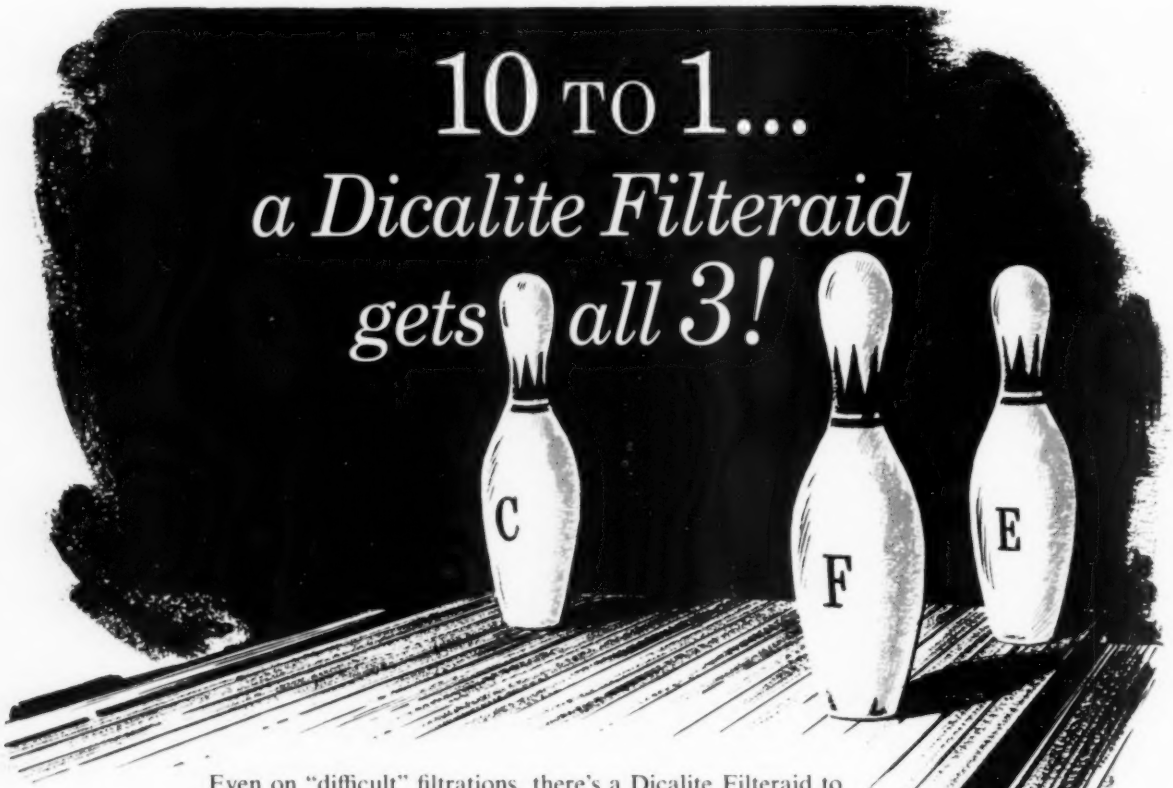
CATERPILLAR*

*Caterpillar y Cat son Marcas Registradas de Caterpillar Tractor Co.

Caterpillar Tractor Co., Peoria, Illinois, E.U.A. • Caterpillar Americas Co., Peoria, Illinois, E.U.A. • Caterpillar Overseas C.A., Caracas, Venezuela • Caterpillar of Australia Pty. Ltd., Melbourne • Caterpillar Brasil S.A., São Paulo • Caterpillar Tractor Co. Ltd., Glasgow, Escocia • Caterpillar of Canada Ltd., Toronto, Ontario

10 TO 1...

a Dicalite Filteraid gets all 3!



Even on "difficult" filtrations, there's a Dicalite Filteraid to give desired Clarity, fast Flowrate and operating Economy—all at once! For Dicalite provides a complete range of filteraid grades . . . and we do mean 'complete.' 10 standard grades, widely used throughout industry. If your problem is particularly difficult, there are a score or more of special Dicalite grades. And, if nothing else will serve, we can probably custom-tailor one for your individual requirements.

But, ninety-nine times out of a hundred, your filtration can be handled by correct selection and proper dosage of one of Dicalite's standard grades. And once you have established the best procedure for your processing you can depend upon it . . . Dicalite Filteraids are famous for their unvarying uniformity and quality, lot after lot.

If you have questions on filtration, why not check with your Dicalite service engineer? His counsel does not obligate you in any way, and his goal is the same as yours—to obtain for you required clarity at maximum throughput with minimum filteraid dosage. Call him, or write us—today.

Among the DIATOMS shown here:

SYNEDRA • NAVICULA • CYMBELLA
SURIRELLA • COSCINODISCUS
ACTINOPTYCHUS • EPITHEMIA
EUNOTIA

Dependable GLC GREAT LAKES **Dicalite**® DIATOMACEOUS MATERIALS

DICALITE DEPARTMENT, *Great Lakes Carbon Corporation, 612 So. Flower St., Los Angeles 17, Calif.*